

Appendix F

**Details of the Radioactive Source Term Sent
from INTEC to RWMC**

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Appendix F

Details of the Radioactive Source Term Sent from INTEC to RWMC

F-1. INTRODUCTION

The radioactive wastes sent to the Radioactive Waste Management Complex (RWMC) from the Idaho Nuclear Technology and Engineering Center (INTEC) were collectively grouped into twelve different waste streams. These waste streams were identified in Tables 2 and 18 of this report; however, some of this information will be repeated here. Unlike the waste streams defined in the Historical Data Task (HDT and the Recent and Projected Data Task (RPDT) (LMITCO 1995a, LMITCO 1995b), the selection of these nine waste streams was not made to identify the buildings or processes that produced these wastes, but to group similar types of waste materials within the same categories.

To begin, radioactive wastes generated at INTEC were usually divided into two periods, depending upon time of disposal: (1) 1952 through 1983 (e.g., the so-called historical period), or (2) 1984 through 1993 (e.g., the recent period). These periods were selected to coincide with those identified in the HDT and RPDT reports. Furthermore, INTEC waste streams identified with a "H" suffix (e.g., INTEC-MOD-1H through INTEC-MOD-9H) are associated with the "historical" time period, and those identified with a "R" suffix (e.g., INTEC-MOD-1R through INTEC-MOD-3R) are considered part of the recent time period.

Disposals of categories of wastes from 1952 through 1983 included fission products, activation products, and actinides. Activities are based on information from both WasteOScope and Form 110 shipping manifests.

Liquid acid pit disposals are estimates of actinide activities sent to the acid pits from 1954 through 1971.

The key waste streams from 1959 through 1970 included solid actinide disposals, Vycor glass disposals, filter disposals, byproducts from a one-time only Navy experiment, and general plant waste. Because of reporting practices in this period of interest, explicit calcine bearing filter disposals and general plant waste disposals were not always clearly differentiated from general plant waste forms in shipping manifests. In addition, shipping documentation for filter disposals during this period was incomplete. Consequently, general plant waste and filter waste were combined. Analysis was performed to differentiate actual filter disposals from general plant waste streams. Moreover, from 1959 through 1970 only net activities (no separate isotopic profile activities) were generally reported. Also during this period, high-activity disposals were generally sent to trench areas for burial and higher activity disposals were sent to pit areas for burial.

Of the reported total waste disposed of during this period, only a fraction of the waste activity accounted for solid actinide waste streams, general plant, and filter waste. Also, only trace amounts of activation products were disposed of during this period. Consequently, for this time frame more than 95% of the net activity was attributed to mixed fission products (MFP). Generally, the scrap actinide waste consisted of unirradiated material with only nominal amounts of alpha activity. Most of the high-activity disposals for this period consisted mainly of fission products that contained smaller amounts of actinides and trace amounts of activation contaminants. Two examples of such waste streams were Vycor glass and byproducts from a one-time Navy sponsored experiment.

From 1971 through 1983, reporting methods transitioned to more detailed breakdowns of isotopic contaminants for the Subsurface Disposal Area (SDA) disposals. Low-activity shipments were typically buried in pit disposal areas and high-activity shipments were sent to either trench or soil vault disposal areas.^a Soil vault disposal activity did not begin until 1977.

Several new kinds of waste streams were sent to the SDA during this period. Disposals of neutron-activated subassembly hardware during this time frame resulted in significant increases in reported net yearly activities mainly in 1973 and 1982. The principal contaminants in this waste stream were activation products. Also, CPP-603 basin sludge and Tank Farm contaminated soil were also significant contributors to the total fission product activities during this period.

Yearly Radioactive Waste Management Information System (RWMIS) isotopic profile activity data is presented from 1971 through 1983. In some circumstances, reported isotopic profiles of disposals were limited to more generic descriptions such as MFP, mixed activation products, and unidentified gamma-beta emitters. For circumstances where these generic definitions were applied to waste stream activities, other assumptions and scaling factors were applied to estimate actual contaminant of concern contents.

F-2. ACID PIT DISPOSAL INVENTORIES

The Acid Pit wastes sent to RWMC from INTEC from 1954 –through 1966 are classified in the INTEC-MOD-1H waste stream. The radioactive source terms contained within the INTEC-MOD-1H waste stream are shown in Table F-1 (best-estimate), Table F-2 (lower-bound) and Table F-3 (upper-bound). The inventory data shown in Table F-1 was determined as follows: a review of the Idaho National Engineering and Environmental Laboratory (INEEL) records (i.e., RWMIS data, WasteOScope data, and/or 110 waste shipment forms) was made to determine the reported amounts (i.e., mass or curie inventory) of unirradiated heavy metals^b from INTEC waste shipments that were disposed of at RWMC. These records were compiled by Craig Kullberg into spreadsheet files that documented the disposals from 1954 through 1966.

The Acid Pit was originally excavated to the top of the basalt bedrock and covers approximately 20,490 ft² (197 × 104 ft). The excavation was covered with 1 to 2 ft of soil. Lime was added periodically to neutralize the acids disposed of in the pit. During operations, a soil cover was applied over the waste at daily or weekly intervals. After the waste was emplaced, the pit was backfilled with approximately 3 ft of soil and an overlaying vegetation layer was added.

A portion of the liquid wastes sent to the SDA consisted of raffinates from fuel reprocessing cold line tests. Raffinates generated in these cold line tests used unirradiated fuel that produced by-products containing aqueous acid solutions and organic solvents. These tests were conducted before beginning a new fuel processing campaign to ensure the uranium recovery efficiency was optimized. These solvents may have included trace amounts of fission products since cold line tests were performed with processing hardware that contained some residual contaminants from other reprocessing campaigns of irradiated fuel. Another portion of the liquid wastes consisted of diluted sludge sent from CPP-603. Some of this sludge material was reported as being diatomaceous earth that possibly originated from filtration systems in the CPP-603 fuel storage basins.

The following assumptions were made to estimate baseline isotopic distributions for known Acid Pit disposals. U-234 was approximated as 1% of the U-235 present for enriched uranium. U-235 was

a. In some cases, large heavily-shielded containers of high-activity CPP-603 basin sludge were sent to pit locations.

b. For this waste stream, the heavy metals consisted of unirradiated or slightly irradiated materials that usually contained uranium (e.g., Experimental Breeder Reactor [EBR]-I blanket rods).

assumed to constitute 93% of the enriched uranium, 0.7% of the natural uranium, and 0.007% of the depleted uranium (99% depletion). U-238 was assumed to represent 7% of enriched uranium (93% enrichment), 99.3% of natural uranium, and essentially all of depleted uranium. Specific activities were then applied, and are 6.3E-03, 2.2E-06, and 3.4E-07 Ci/g for U-234, U-235, and U-238, respectively. In some cases, the determination of uranium isotopic compositions was based on professional judgments, because not all shipments explicitly reported whether disposals consisted of depleted or natural uranium.

The overall uncertainty in the best-estimate bulk actinide inventories was judged to be a factor of 1.50. This judgment was based on a review of all data examined and the likely uncertainty in reporting practices on the 110 shipping forms. Therefore, to compute the lower-bound bulk actinide inventory for each time-period, the best-estimate numbers were divided by 1.50. In order to compute the upper-bound bulk actinide inventories, the best-estimate numbers were multiplied by 1.50.

Table F-1. Best-estimate activities associated with Acid Pit wastes sent to RWMC from 1954 through 1966. (These inventories are included in the INTEC-MOD-1H waste stream).

Year	U-234 (Ci)	U-235 (Ci)	U-238 (Ci)
1954	1.90E-02	6.70E-04	2.70E-02
1955	3.40E-02	1.20E-03	6.30E-02
1956	9.50E-03	3.30E-04	6.90E-03
1957	1.70E-03	6.00E-05	1.30E-03
1958	1.50E-03	5.10E-05	7.10E-04
1959	1.60E-04	5.60E-06	1.20E-04
1960	0.00E+00	0.00E+00	0.00E+00
1961	0.00E+00	0.00E+00	0.00E+00
1962	3.50E-04	1.20E-05	2.60E-04
1963	0.00E+00	0.00E+00	0.00E+00
1964	2.50E-05	8.80E-07	1.10E-08
1965	0.00E+00	0.00E+00	0.00E+00
1966	2.30E-04	8.00E-06	9.60E-08
Total	6.60E-02	2.30E-03	9.90E-02

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Table F-2. Lower-bound activities associated with Acid Pit wastes sent to RWMC from 1954 through 1966. (These inventories are included in the INTEC-MOD-1H waste stream).

Year	U-234 (Ci)	U-235 (Ci)	U-238 (Ci)
1954	1.27E-02	4.47E-04	1.80E-02
1955	2.27E-02	8.00E-04	4.20E-02
1956	6.33E-03	2.20E-04	4.60E-03
1957	1.13E-03	4.00E-05	8.67E-04
1958	1.00E-03	3.40E-05	4.73E-04
1959	1.07E-04	3.73E-06	8.00E-05
1960	0.00E+00	0.00E+00	0.00E+00
1961	0.00E+00	0.00E+00	0.00E+00
1962	2.33E-04	8.00E-06	1.73E-04
1963	0.00E+00	0.00E+00	0.00E+00
1964	1.67E-05	5.87E-07	7.33E-09
1965	0.00E+00	0.00E+00	0.00E+00
1966	1.53E-04	5.33E-06	6.40E-08
Total	4.40E-02	1.53E-03	6.60E-02

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Table F-3. Upper-bound activities associated with Acid Pit wastes sent to RWMC from 1954 through 1966. (These inventories are included in the INTEC-MOD-1H waste stream).

Year	U-234 (Ci)	U-235 (Ci)	U-238 (Ci)
1954	2.90E-02	1.00E-03	4.00E-02
1955	5.10E-02	1.80E-03	9.40E-02
1956	1.40E-02	5.00E-04	1.00E-02
1957	2.60E-03	9.00E-05	1.90E-03
1958	2.20E-03	7.70E-05	1.10E-03
1959	2.40E-04	8.40E-06	1.80E-04
1960	0.00E+00	0.00E+00	0.00E+00
1961	0.00E+00	0.00E+00	0.00E+00
1962	5.20E-04	1.80E-05	3.90E-04
1963	0.00E+00	0.00E+00	0.00E+00
1964	3.80E-05	1.30E-06	1.60E-08
1965	0.00E+00	0.00E+00	0.00E+00
1966	3.50E-04	1.20E-05	1.40E-07
Total	1.00E-01	3.50E-03	1.50E-01

File = "CIDRAacidpit.xls"

F-3. VYCOR GLASS DISPOSALS SENT FROM INTEC TO RWMC

Leached Vycor glass-bearing waste sent from INTEC to RWMC from 1966 through 1970 are classified in the INTEC-MOD-2H waste stream. This waste stream consisted of significant amounts of fission contaminants along with actinide contaminant residues embedded in the Vycor glass material. The Vycor glass was used as molds for the casting of new EBR-II fuel pins. The casting operation was conducted at Argonne National Laboratory-West (ANL-W). Shipments from ANL-W to INTEC of Vycor scrap were made for reprocessing from July 1965 through December 1969. Additionally, it was estimated that approximately 610 kg of Vycor scrap containing 80 kg of fuel alloy material went to INTEC for reprocessing.

At INTEC, the Vycor glass was then leached with hot nitric acid to recover embedded uranium residues (estimated to be about 80 kg of enriched uranium). It was estimated that 80 to 90% of the embedded uranium was recovered in the leaching process. The remaining leached glass waste still contained substantial amounts of fission products with some remaining actinides and transuranic (TRU) residues before burial in the SDA. The net amount of fuel scrap in these shipments was estimated to be in the range of 8 to 16 kg after the leaching process was completed. About 4 tons of new fuel pins were manufactured with the Vycor glass casting process.

The Vycor glass was shipped in 10-in. high metal cans to INTEC for processing. These cans were put in lead-shielded 3-ton casks. After the uranium leaching process was finished the treated glass was returned to the same metal can and the can was resealed and buried. At a later period of the reprocessing campaign, these metal cans were supplied with stainless steel liners at ANL-W before shipping to INTEC. Vycor glass disposals to the SDA began in 1966 and ended in 1970. The net total activity for this waste stream amounted to 4.6E4 Ci. The total was based on known shipments of Vycor glass that were reported on Form 110 shipping manifests.

The actual method for estimating reported disposals activities for the shipments was unknown. For the purpose of the reassessment analysis, it was assumed that Cs-137 was the dominant gamma-emitting isotope measured in these waste shipments. It was assumed that sufficient time had passed to allow other shorter half-lived gamma emitting isotopes to become insignificant. This assumption was judged as reasonable, because expended fuel from EBR-II was not immediately reprocessed.

In order to reassess the contaminant profiles in these streams, it was assumed the relative amounts of fission products were disproportionately larger than the corresponding actinide contaminants. It was judged that the higher mobility fission products were more likely to adhere to the Vycor glass molds, as opposed to solidified metallic actinide fuel. Calculations for spent EBR-II Mark-I fuel were employed to develop updated contaminant distributions for this waste stream.

The fission products were scaled to Cs-137, and the actinides and actinide decay products were scaled to U-235. The ORIGEN2 based calculations were based on early Mark-I EBR-II fuel designs with approximately 2% burnup of U-235 and 52% enrichment. However, during the ANL-W fuel reprocessing campaign, some fuel burnups were as high as 6% and enrichments as high as 67%. The fission products were calculated by assuming that Cs-137 was the dominant gamma emitter so all fission products were scaled to 4.6E4 Ci. The proportionately lower actinide activities were scaled to 8 kg of fuel at 52% U-235 enrichment.

Table F-4. Best-estimate activities associated with Vycor glass bearing waste sent to RWMC from 1966 through 1970. (These inventories are included in the INTEC-MOD-2H waste stream).

Nuclide	1966	1967	1968	1969	1970
H-3	1.4E+02	1.1E+02	7.8E+01	1.3E+01	3.7E-01
Be-10	5.8E-07	4.5E-07	3.3E-07	5.5E-08	1.5E-09
C-14	2.3E-05	1.8E-05	1.3E-05	2.2E-06	6.2E-08
Sr-90	1.7E+04	1.4E+04	9.9E+03	1.7E+03	4.6E+01
Nb-94	3.4E-06	2.7E-06	2.0E-06	3.3E-07	9.2E-09
Tc-99	2.7E+00	2.1E+00	1.6E+00	2.6E-01	7.3E-03
I-129	7.3E-03	5.8E-03	4.2E-03	7.1E-04	2.0E-05
Cs-137	1.9E+04	1.5E+04	1.1E+04	1.8E+03	5.0E+01
Eu-152	1.0E-01	7.9E-02	5.7E-02	9.6E-03	2.7E-04
Eu-154	1.6E+01	1.3E+01	9.3E+00	1.6E+00	4.4E-02
Pb-210	1.3E-10	1.0E-10	7.5E-11	1.3E-11	3.5E-13
Ra-226	3.3E-09	2.6E-09	1.9E-09	3.1E-10	8.8E-12
Ra-228	2.1E-14	1.7E-14	1.2E-14	2.0E-15	5.7E-17
Ac-227	1.9E-08	1.5E-08	1.1E-08	1.8E-09	5.0E-11
Th-228	1.4E-05	1.1E-05	8.3E-06	1.4E-06	3.9E-08
Th-229	4.0E-10	3.2E-10	2.3E-10	3.9E-11	1.1E-12
Th-230	3.8E-06	3.0E-06	2.2E-06	3.7E-07	1.0E-08
Th-232	1.3E-13	1.0E-13	7.3E-14	1.2E-14	3.4E-16
Pa-231	3.1E-07	2.4E-07	1.8E-07	3.0E-08	8.3E-10
U-232	2.0E-05	1.6E-05	1.2E-05	2.0E-06	5.5E-08
U-233	7.7E-07	6.0E-07	4.4E-07	7.4E-08	2.1E-09
U-234	1.1E-01	8.5E-02	6.2E-02	1.0E-02	2.9E-04
U-235	3.7E-03	2.9E-03	2.1E-03	3.5E-04	9.9E-06
U-236	7.2E-04	5.6E-04	4.1E-04	6.9E-05	1.9E-06
U-238	5.2E-04	4.1E-04	3.0E-04	5.0E-05	1.4E-06
Np-237	5.4E-05	4.2E-05	3.1E-05	5.2E-06	1.5E-07
Pu-238	7.1E-03	5.6E-03	4.1E-03	6.8E-04	1.9E-05
Pu-239	2.9E-01	2.3E-01	1.7E-01	2.8E-02	7.8E-04
Pu-240	2.2E-03	1.7E-03	1.2E-03	2.1E-04	5.8E-06
Pu-241	1.3E-03	1.0E-03	7.4E-04	1.2E-04	3.5E-06
Pu-242	5.4E-11	4.3E-11	3.1E-11	5.2E-12	1.5E-13
Pu-244	6.3E-22	5.0E-22	3.6E-22	6.1E-23	1.7E-24
Am-241	7.2E-06	5.7E-06	4.1E-06	6.9E-07	1.9E-08
Am-243	2.2E-12	1.8E-12	1.3E-12	2.1E-13	6.0E-15
Cm-243	5.3E-12	4.1E-12	3.0E-12	5.1E-13	1.4E-14
Cm-244	1.1E-12	9.0E-13	6.5E-13	1.1E-13	3.1E-15
Cm-245	2.8E-18	2.2E-18	1.6E-18	2.7E-19	7.4E-21
Cm-246	1.6E-21	1.3E-21	9.4E-22	1.6E-22	4.4E-24

Table F-5. Lower-bound activities associated with Vycor glass bearing waste sent to RWMC from 1966 through 1970. (These inventories are included in the INTEC-MOD-2H waste stream).

Nuclide	1966	1967	1968	1969	1970
H-3	9.1E+01	7.2E+01	5.2E+01	8.8E+00	2.5E-01
Be-10	3.8E-07	3.0E-07	2.2E-07	3.7E-08	1.0E-09
C-14	1.5E-05	1.2E-05	8.9E-06	1.5E-06	4.2E-08
Sr-90	1.2E+04	9.0E+03	6.6E+03	1.1E+03	3.1E+01
Nb-94	2.3E-06	1.8E-06	1.3E-06	2.2E-07	6.1E-09
Tc-99	1.8E+00	1.4E+00	1.0E+00	1.7E-01	4.9E-03
I-129	4.9E-03	3.8E-03	2.8E-03	4.7E-04	1.3E-05
Cs-137	1.2E+04	9.8E+03	7.2E+03	1.2E+03	3.4E+01
Eu-152	6.7E-02	5.2E-02	3.8E-02	6.4E-03	1.8E-04
Eu-154	1.1E+01	8.5E+00	6.2E+00	1.0E+00	2.9E-02
Pb-210	8.8E-11	6.9E-11	5.0E-11	8.4E-12	2.4E-13
Ra-226	2.2E-09	1.7E-09	1.2E-09	2.1E-10	5.9E-12
Ra-228	1.4E-14	1.1E-14	8.1E-15	1.4E-15	3.8E-17
Ac-227	1.2E-08	9.7E-09	7.1E-09	1.2E-09	3.3E-11
Th-228	9.7E-06	7.6E-06	5.5E-06	9.3E-07	2.6E-08
Th-229	2.7E-10	2.1E-10	1.5E-10	2.6E-11	7.2E-13
Th-230	2.5E-06	2.0E-06	1.5E-06	2.5E-07	6.9E-09
Th-232	8.5E-14	6.7E-14	4.9E-14	8.2E-15	2.3E-16
Pa-231	2.0E-07	1.6E-07	1.2E-07	2.0E-08	5.5E-10
U-232	1.4E-05	1.1E-05	7.8E-06	1.3E-06	3.6E-08
U-233	5.1E-07	4.0E-07	2.9E-07	4.9E-08	1.4E-09
U-234	7.2E-02	5.7E-02	4.1E-02	6.9E-03	1.9E-04
U-235	2.4E-03	1.9E-03	1.4E-03	2.4E-04	6.6E-06
U-236	4.8E-04	3.8E-04	2.7E-04	4.6E-05	1.3E-06
U-238	3.5E-04	2.7E-04	2.0E-04	3.3E-05	9.3E-07
Np-237	3.6E-05	2.8E-05	2.1E-05	3.5E-06	9.7E-08
Pu-238	4.7E-03	3.7E-03	2.7E-03	4.6E-04	1.3E-05
Pu-239	1.9E-01	1.5E-01	1.1E-01	1.9E-02	5.2E-04
Pu-240	1.4E-03	1.1E-03	8.2E-04	1.4E-04	3.9E-06
Pu-241	8.6E-04	6.7E-04	4.9E-04	8.3E-05	2.3E-06
Pu-242	3.6E-11	2.8E-11	2.1E-11	3.5E-12	9.7E-14
Pu-244	4.2E-22	3.3E-22	2.4E-22	4.1E-23	1.1E-24
Am-241	4.8E-06	3.8E-06	2.8E-06	4.6E-07	1.3E-08
Am-243	1.5E-12	1.2E-12	8.5E-13	1.4E-13	4.0E-15
Cm-243	3.5E-12	2.8E-12	2.0E-12	3.4E-13	9.4E-15
Cm-244	7.6E-13	6.0E-13	4.4E-13	7.3E-14	2.0E-15
Cm-245	1.8E-18	1.4E-18	1.1E-18	1.8E-19	5.0E-21
Cm-246	1.1E-21	8.6E-22	6.3E-22	1.1E-22	2.9E-24

Table F-6. Upper-bound activities associated with Vycor glass bearing waste sent to RWMC from 1966 through 1970. (These inventories are included in the INTEC-MOD-2H waste stream).

Nuclide	1966	1967	1968	1969	1970
H-3	2.1E+02	1.6E+02	1.2E+02	2.0E+01	5.5E-01
Be-10	8.6E-07	6.8E-07	4.9E-07	8.3E-08	2.3E-09
C-14	3.5E-05	2.7E-05	2.0E-05	3.4E-06	9.4E-08
Sr-90	2.6E+04	2.0E+04	1.5E+04	2.5E+03	7.0E+01
Nb-94	5.1E-06	4.0E-06	2.9E-06	4.9E-07	1.4E-08
Tc-99	4.1E+00	3.2E+00	2.3E+00	3.9E-01	1.1E-02
I-129	1.1E-02	8.6E-03	6.2E-03	1.1E-03	3.0E-05
Cs-137	2.8E+04	2.2E+04	1.6E+04	2.7E+03	7.6E+01
Eu-152	1.5E-01	1.2E-01	8.5E-02	1.4E-02	4.0E-04
Eu-154	2.4E+01	1.9E+01	1.4E+01	2.4E+00	6.6E-02
Pb-210	2.0E-10	1.5E-10	1.1E-10	1.9E-11	5.3E-13
Ra-226	4.9E-09	3.8E-09	2.8E-09	4.7E-10	1.3E-11
Ra-228	3.2E-14	2.5E-14	1.8E-14	3.1E-15	8.6E-17
Ac-227	2.8E-08	2.2E-08	1.6E-08	2.7E-09	7.5E-11
Th-228	2.2E-05	1.7E-05	1.2E-05	2.1E-06	5.9E-08
Th-229	6.0E-10	4.7E-10	3.4E-10	5.8E-11	1.6E-12
Th-230	5.7E-06	4.5E-06	3.2E-06	5.5E-07	1.5E-08
Th-232	1.9E-13	1.5E-13	1.1E-13	1.8E-14	5.1E-16
Pa-231	4.6E-07	3.6E-07	2.6E-07	4.4E-08	1.2E-09
U-232	3.1E-05	2.4E-05	1.7E-05	2.9E-06	8.2E-08
U-233	1.2E-06	9.1E-07	6.5E-07	1.1E-07	3.1E-09
U-234	1.6E-01	1.3E-01	9.2E-02	1.6E-02	4.4E-04
U-235	5.5E-03	4.3E-03	3.1E-03	5.3E-04	1.5E-05
U-236	1.1E-03	8.4E-04	6.1E-04	1.0E-04	2.9E-06
U-238	7.8E-04	6.1E-04	4.4E-04	7.5E-05	2.1E-06
Np-237	8.1E-05	6.4E-05	4.6E-05	7.8E-06	2.2E-07
Pu-238	1.1E-02	8.4E-03	6.0E-03	1.0E-03	2.9E-05
Pu-239	4.3E-01	3.4E-01	2.5E-01	4.2E-02	1.2E-03
Pu-240	3.2E-03	2.5E-03	1.8E-03	3.1E-04	8.7E-06
Pu-241	1.9E-03	1.5E-03	1.1E-03	1.9E-04	5.2E-06
Pu-242	8.1E-11	6.4E-11	4.6E-11	7.8E-12	2.2E-13
Pu-244	9.5E-22	7.4E-22	5.4E-22	9.1E-23	2.5E-24
Am-241	1.1E-05	8.5E-06	6.1E-06	1.0E-06	2.9E-08
Am-243	3.3E-12	2.6E-12	1.9E-12	3.2E-13	9.0E-15
Cm-243	7.9E-12	6.2E-12	4.5E-12	7.6E-13	2.1E-14
Cm-244	1.7E-12	1.3E-12	9.7E-13	1.6E-13	4.6E-15
Cm-245	4.1E-18	3.3E-18	2.4E-18	4.0E-19	1.1E-20
Cm-246	2.5E-21	1.9E-21	1.4E-21	2.4E-22	6.6E-24

F-4. ACTINIDE SHIPPING DISPOSAL INVENTORIES SENT FROM INTEC TO RWMC

The actinide wastes sent from INTEC to RWMC from 1962 through 1983 are classified in the INTEC-MOD-3H waste stream. Shipping manifests demonstrate that disposals of unirradiated and some irradiated actinide solid waste were explicitly identified in shipping records from 1962 through 1983. These materials included dissolved fuel samples that were stabilized in solid media like vermiculite, solid fuel scrap, sporadic miscellaneous irradiated fissile material, and larger bulk disposals of uranium and thorium bearing materials. Key bulk waste streams included fuel mockup disposals that consisted of thorium, depleted or natural uranium from CPP-601, and enriched fuel scrap from laboratory support facilities such as CPP-627. Some of this fuel scrap material was from other facilities. Examples of such scrap disposals included EBR-I fuel from ANL-W and fuel pellets from the Power Burst Facility. All of the radioactive materials in these wastes streams were produced from either unirradiated or irradiated fuel, dissolved fuel, miscellaneous fuel specimens, and other fuel contaminated hardware. As previously discussed, the primary source of information for these data was INEEL records (i.e., RWMIS electronic data, WasteOScope electronic data, and/or paper copies of 110 waste shipment forms). These records were compiled into spreadsheet files and analyzed by Craig Kullberg.

A year-by-year break out of net actinide disposals is presented in Table F-7. The yearly disposals were calculated using spreadsheet numbers from the WasteOScope and RWMIS databases. In some cases, cross checking the Form 110 disposal manifest against these databases showed that some corrections were required. In particular, not all trans-shipped disposals were recorded in these databases.

Table F-7 also contains some plutonium disposals, including trace amounts of other TRU contaminants for some shipments containing irradiated fissile material. A total 790 kg of actinide heavy metal was explicitly reported in these actinide waste streams. Additionally, about 500 Ci of net activity was reported in conjunction with this waste stream. However, this activity was mainly attributed to fission contaminants that occurred in a very limited number of shipments sent to the SDA in the 1960s. Because of the much larger volumes of fission activity reported in other waste streams, these fission contaminants have been neglected in the analysis presented in this section.

Net disposals of heavy metal contaminants for this waste stream included reported amounts consisting of 4.6E02 kg of natural uranium, 2.3E+02 kg of depleted uranium, 4.4 kg of enriched uranium, and 1.0E+02 of thorium. In some circumstances shipments were explicitly identified as depleted or natural uranium. In other circumstances, limited information required that enrichment levels had to be inferred.

The distributions of U-238, U-235, and U-234 for different enrichments are dependent on processing histories. For depleted uranium, the distribution of U-238 and U-235 are 99.8% and 0.2%, respectively. For natural uranium, the distribution of U-238 and U-235 are 99.3 and 0.7%, respectively. For natural uranium and depleted uranium, the ratio of U-234 to U-235 was set at 0.8%. For enriched disposals, the fraction of U-234 was conservatively estimated to be 1% of the U-235 mass. Trace amounts of U-236, along with other unreported amounts of TRU contaminants, may have been present in some shipments.^c However, these contaminants were neglected because they were judged to be a small fraction of the net amounts present in other major waste streams.

To calculate best-estimate contaminant activities, assumptions about uncertainties associated with the above solid actinide waste streams were made. A generic uncertainty factor of 1.5 was employed to estimate best-estimate and upper-bound activities associated with solid waste streams. Other waste-

c. Later shipments containing unirradiated EU may have contained U-236, if this EU consisted of reprocessed fuel.

-stream dependent reasons for using these uncertainty factors revolve around current limitations in disposal documentation, including:

- Possible incomplete documentation of trans-shipped actinide disposals from outside facilities, such as Atomics International.
- Incomplete documentation of solid waste disposals that may have contained significant amounts of accounted for actinides in the 1950s.
- Possible unreported actinide disposals that were reported as general plant waste or collocated with low activity general plant waste.

Table F-7. Best-estimate activities associated with actinide wastes sent to RWMC from 1962 through 1983. (These inventories are included in the INTEC-MOD-3H waste stream).

Year	U-234 (Ci)	U-235 (Ci)	U-238 (Ci)	Pu-239 (Ci)	Th-232 (Ci)
1962	7.0E-03	2.4E-04	6.5E-04		
1963	7.0E-02	2.4E-03	0.0E+00		
1964	2.7E-05	9.4E-07	0.0E+00		
1965					
1966	3.2E-03	1.1E-04	5.7E-05		
1967	6.2E-02	2.8E-03	6.3E-02		
1968	4.6E-02	2.0E-03	3.9E-02		
1969	2.6E-04	8.8E-06	1.5E-06		
1970	9.7E-02	4.2E-03	9.9E-02		
1971	1.2E-02	4.1E-04	1.4E-03	1.8E-01	
1972	8.5E-02	2.9E-03	1.0E-04		1.097E-07
1973	1.5E-02	6.5E-04	2.2E-02		
1974	4.2E-03	1.4E-04	1.9E-03		
1975	2.7E-02	9.2E-04	7.5E-05		1.1E-02
1976	4.3E-04	1.5E-05	1.1E-05		
1977					
1978					
1979					
1980					1.155E-05
1981					
1982	6.8E-05	3.1E-06	1.1E-03		
1983			1.5E-05	1.2E-03	

Table F-8. Lower-bound activities associated with actinide wastes sent to RWMC from 1962 through 1983. (These inventories are included in the INTEC-MOD-3H waste stream).

Year	U-234 (Ci)	U-235 (Ci)	U-238 (Ci)	Pu-239 (Ci)	Th-232 (Ci)
1962	4.7E-03	1.6E-04	4.4E-04		
1963	4.7E-02	1.6E-03			
1964	1.8E-05	6.3E-07			
1965					
1966	2.1E-03	7.4E-05	3.8E-05		
1967	4.2E-02	1.9E-03	4.2E-02		
1968	3.0E-02	1.3E-03	2.6E-02		
1969	1.7E-04	5.9E-06	1.0E-06		
1970	6.5E-02	2.8E-03	6.6E-02		
1971	7.9E-03	2.7E-04	9.4E-04	1.2E-01	
1972	5.7E-02	2.0E-03	6.7E-05		7.3E-08
1973	1.0E-02	4.3E-04	1.4E-02		
1974	2.8E-03	9.7E-05	1.3E-03		
1975	1.8E-02	6.2E-04	5.0E-05		7.3E-03
1976	2.9E-04	1.0E-05	7.1E-06		
1977					
1978					
1979					
1980					7.7E-06
1981					
1982	4.5E-05	2.1E-06	7.2E-04		
1983			1.0E-05	8.2E-04	

Table F-9. Upper-bound activities associated with actinide wastes sent to RWMC from 1962 through 1983. (These inventories are included in the INTEC-MOD-3H waste stream).

Year	U-234 (Ci)	U-235 (Ci)	U-238 (Ci)	Pu-239 (Ci)	Th-232 (Ci)
1962	1.1E-02	3.7E-04	9.8E-04		
1963	1.1E-01	3.7E-03			
1964	4.1E-05	1.4E-06			
1965					
1966	4.8E-03	1.7E-04	8.6E-05		
1967	9.3E-02	4.3E-03	9.5E-02		
1968	6.8E-02	3.0E-03	5.9E-02		
1969	3.8E-04	1.3E-05	2.3E-06		
1970	1.5E-01	6.3E-03	1.5E-01		
1971	1.8E-02	6.1E-04	2.1E-03	2.8E-01	
1972	1.3E-01	4.4E-03	1.5E-04		1.6E-07
1973	2.3E-02	9.7E-04	3.3E-02		
1974	6.3E-03	2.2E-04	2.9E-03		
1975	4.0E-02	1.4E-03	1.1E-04		1.6E-02
1976	6.5E-04	2.2E-05	1.6E-05		
1977					
1978					
1979					
1980					1.7E-05
1981					
1982	1.0E-04	4.7E-06	1.6E-03		

F-5. ONE-TIME NAVAL REACTORS FACILITY TEST CONTAMINANTS SENT FROM INTEC TO RWMC

Experimental contaminant byproducts wastes sent to the RWMC from INTEC from 1960 through 1983 are classified in the INTEC-MOD-4H waste stream. These contaminant by-products were the result of various experiments and tests conducted at INTEC during the Historical Data Task (HDT) period. One by-product waste stream was identified as emanating from a Navy sponsored Engineering Test Reactor experiment. This waste stream consisted of significant amounts of fission contaminants, along with actinide contaminant residues and some possible activation products. However, it was determined that this particular waste stream had no more Cs-137 per unit weight than other similar irradiated actinide streams. The best-estimate amount of Cs-137 for this shipment was reassessed to be 7 Ci. This shipment was only a fraction of the total 5.4E2 Ci Cs-137 associated with irradiated actinide material sent to the SDA.

For the purpose of the reassessment analysis, it was assumed that Cs-137 was the dominant gamma-emitting isotope measured in most waste shipments containing irradiated actinide materials.^d It was assumed that sufficient time had passed to allow other shorter half-lived gamma emitting isotopes to become insignificant. To reassess the non-uranium contaminant profiles in this stream, a set of calcine based scaling factors was used. The updated contaminant distributions for this waste stream used an assumed isotopic profile matching zirconium bearing calcine. The isotopic profile of interest was based on ORIGEN2 analysis. All isotopes were scaled to Cs-137.

d. There was one exception to this generality. In 1969, a one-time only disposal reported net gamma plus beta activities of 4E4 Ci. Most of this activity turned out to be short half-lived isotopes. The irradiated specimen was fresh and had little time to cool down.

Table F-10. Best-estimate activities associated with experimental contaminant byproducts wastes sent to RWMC from 1960 through 1983. (These inventories are included in the INTEC-MOD-4H waste stream).

Nuclide	1962	1963	1966	1968	1969	1975
H-3	1.5E-01	4.1E-01	7.1E-01	4.4E-01	2.3E-02	4.5E-02
Be-10	1.5E-09	4.2E-09	7.3E-09	4.5E-09	2.4E-10	4.6E-10
C-14	6.2E-08	1.7E-07	2.9E-07	1.8E-07	9.5E-09	1.8E-08
Co-60	5.5E-02	1.5E-01	2.6E-01	1.6E-01	8.4E-03	1.6E-02
Ni-63	2.6E-02	6.9E-02	1.2E-01	7.4E-02	3.9E-03	7.6E-03
Sr-90	6.1E+01	1.6E+02	2.9E+02	1.8E+02	9.2E+00	1.8E+01
Nb-94	1.2E-08	3.2E-08	5.6E-08	3.4E-08	1.8E-09	3.5E-09
Tc-99	7.7E-03	2.1E-02	3.6E-02	2.2E-02	1.2E-03	2.3E-03
I-129	1.2E-05	3.4E-05	5.9E-05	3.6E-05	1.9E-06	3.7E-06
Cs-137	4.6E+01	1.2E+02	2.2E+02	1.3E+02	7.0E+00	1.4E+01
Eu-152	4.9E-03	1.3E-02	2.3E-02	1.4E-02	7.5E-04	1.5E-03
Eu-154	9.0E-01	2.4E+00	4.3E+00	2.6E+00	1.4E-01	2.7E-01
Pb-210	6.7E-14	1.8E-13	3.2E-13	1.9E-13	1.0E-14	2.0E-14
Ra-226	7.8E-13	2.1E-12	3.7E-12	2.2E-12	1.2E-13	2.3E-13
Ra-228	3.2E-14	8.7E-14	1.5E-13	9.3E-14	4.9E-15	9.5E-15
Ac-227	8.7E-09	2.4E-08	4.1E-08	2.5E-08	1.3E-09	2.6E-09
Th-228	3.3E-07	9.0E-07	1.6E-06	9.6E-07	5.1E-08	9.8E-08
Th-229	2.7E-12	7.4E-12	1.3E-11	7.9E-12	4.2E-13	8.1E-13
Th-230	4.3E-10	1.2E-09	2.0E-09	1.2E-09	6.5E-11	1.3E-10
Th-232	1.1E-13	3.0E-13	5.3E-13	3.2E-13	1.7E-14	3.3E-14
U-232	1.9E-09	5.2E-09	9.1E-09	5.6E-09	2.9E-10	5.7E-10
U-233	2.0E-11	5.5E-11	9.5E-11	5.8E-11	3.1E-12	6.0E-12
U-234	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-235	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-236	4.8E-06	1.3E-05	2.3E-05	1.4E-05	7.4E-07	1.4E-06
U-238	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Np-237	8.9E-06	2.4E-05	4.2E-05	2.6E-05	1.4E-06	2.7E-06
Pu-238	4.6E-01	1.3E+00	2.2E+00	1.3E+00	7.1E-02	1.4E-01
Pu-239	5.9E-03	1.6E-02	2.8E-02	1.7E-02	9.0E-04	1.7E-03
Pu-240	5.5E-03	1.5E-02	2.6E-02	1.6E-02	8.3E-04	1.6E-03
Pu-241	6.5E-01	1.8E+00	3.1E+00	1.9E+00	1.0E-01	1.9E-01
Pu-242	1.2E-05	3.3E-05	5.7E-05	3.5E-05	1.8E-06	3.6E-06
Pu-243	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-244	2.1E-18	5.7E-18	9.9E-18	6.1E-18	3.2E-19	6.2E-19
Am-241	2.7E-02	7.3E-02	1.3E-01	7.7E-02	4.1E-03	7.9E-03
Am-242	1.2E-08	3.4E-08	5.9E-08	3.6E-08	1.9E-09	3.7E-09
Am-243	7.1E-10	1.9E-09	3.4E-09	2.1E-09	1.1E-10	2.1E-10
Cm-242	1.0E-08	2.8E-08	4.9E-08	3.0E-08	1.6E-09	3.1E-09
Cm-243	3.5E-10	9.5E-10	1.7E-09	1.0E-09	5.4E-11	1.0E-10
Cm-244	4.6E-09	1.2E-08	2.2E-08	1.3E-08	7.0E-10	1.4E-09
Cm-245	5.9E-14	1.6E-13	2.8E-13	1.7E-13	9.0E-15	1.8E-14
Cm-246	9.1E-16	2.5E-15	4.3E-15	2.6E-15	1.4E-16	2.7E-16
Cm-247	2.2E-22	5.9E-22	1.0E-21	6.3E-22	3.3E-23	6.5E-23
Cm-248	4.3E-23	1.2E-22	2.0E-22	1.2E-22	6.5E-24	1.3E-23

Table F-11. Lower-bound activities associated with experimental contaminant byproducts wastes sent to RWMC from 1960 through 1983. (These inventories are included in the INTEC-MOD-4H waste stream).

Nuclide	1962	1963	1966	1968	1969	1975
H-3	7.6E-02	2.0E-01	3.6E-01	2.2E-01	1.2E-02	2.2E-02
Be-10	7.7E-10	2.1E-09	3.7E-09	2.2E-09	1.2E-10	2.3E-10
C-14	3.1E-08	8.4E-08	1.5E-07	9.0E-08	4.8E-09	9.2E-09
Co-60	2.8E-02	7.5E-02	1.3E-01	8.0E-02	4.2E-03	8.2E-03
Ni-63	1.3E-02	3.5E-02	6.1E-02	3.7E-02	2.0E-03	3.8E-03
Sr-90	3.0E+01	8.2E+01	1.4E+02	8.8E+01	4.6E+00	9.0E+00
Nb-94	5.9E-09	1.6E-08	2.8E-08	1.7E-08	9.0E-10	1.7E-09
Tc-99	3.8E-03	1.0E-02	1.8E-02	1.1E-02	5.8E-04	1.1E-03
I-129	6.2E-06	1.7E-05	3.0E-05	1.8E-05	9.5E-07	1.9E-06
Cs-137	2.3E+01	6.2E+01	1.1E+02	6.7E+01	3.5E+00	6.8E+00
Eu-152	2.4E-03	6.6E-03	1.2E-02	7.1E-03	3.7E-04	7.3E-04
Eu-154	4.5E-01	1.2E+00	2.1E+00	1.3E+00	6.9E-02	1.3E-01
Pb-210	3.3E-14	9.1E-14	1.6E-13	9.7E-14	5.1E-15	9.9E-15
Ra-226	3.9E-13	1.1E-12	1.8E-12	1.1E-12	5.9E-14	1.2E-13
Ra-228	1.6E-14	4.4E-14	7.6E-14	4.7E-14	2.5E-15	4.8E-15
Ac-227	4.4E-09	1.2E-08	2.1E-08	1.3E-08	6.6E-10	1.3E-09
Th-228	1.7E-07	4.5E-07	7.8E-07	4.8E-07	2.5E-08	4.9E-08
Th-229	1.4E-12	3.7E-12	6.5E-12	3.9E-12	2.1E-13	4.1E-13
Th-230	2.1E-10	5.8E-10	1.0E-09	6.2E-10	3.3E-11	6.3E-11
Th-232	5.6E-14	1.5E-13	2.6E-13	1.6E-13	8.5E-15	1.7E-14
U-232	9.6E-10	2.6E-09	4.5E-09	2.8E-09	1.5E-10	2.8E-10
U-233	1.0E-11	2.7E-11	4.8E-11	2.9E-11	1.5E-12	3.0E-12
U-234	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-235	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-236	2.4E-06	6.6E-06	1.1E-05	7.0E-06	3.7E-07	7.2E-07
U-238	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Np-237	4.5E-06	1.2E-05	2.1E-05	1.3E-05	6.8E-07	1.3E-06
Pu-238	2.3E-01	6.3E-01	1.1E+00	6.7E-01	3.5E-02	6.9E-02
Pu-239	3.0E-03	8.0E-03	1.4E-02	8.5E-03	4.5E-04	8.7E-04
Pu-240	2.7E-03	7.4E-03	1.3E-02	7.9E-03	4.2E-04	8.1E-04
Pu-241	3.3E-01	8.8E-01	1.5E+00	9.4E-01	5.0E-02	9.7E-02
Pu-242	6.1E-06	1.6E-05	2.9E-05	1.7E-05	9.2E-07	1.8E-06
Pu-243	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-244	1.0E-18	2.8E-18	5.0E-18	3.0E-18	1.6E-19	3.1E-19
Am-241	1.3E-02	3.6E-02	6.3E-02	3.9E-02	2.0E-03	4.0E-03
Am-242	6.2E-09	1.7E-08	2.9E-08	1.8E-08	9.5E-10	1.8E-09
Am-243	3.6E-10	9.6E-10	1.7E-09	1.0E-09	5.4E-11	1.1E-10
Cm-242	5.2E-09	1.4E-08	2.4E-08	1.5E-08	7.9E-10	1.5E-09
Cm-243	1.8E-10	4.8E-10	8.3E-10	5.1E-10	2.7E-11	5.2E-11
Cm-244	2.3E-09	6.2E-09	1.1E-08	6.6E-09	3.5E-10	6.8E-10
Cm-245	3.0E-14	8.0E-14	1.4E-13	8.5E-14	4.5E-15	8.8E-15
Cm-246	4.6E-16	1.2E-15	2.2E-15	1.3E-15	7.0E-17	1.4E-16
Cm-247	1.1E-22	3.0E-22	5.2E-22	3.2E-22	1.7E-23	3.2E-23
Cm-248	2.1E-23	5.8E-23	1.0E-22	6.2E-23	3.3E-24	6.4E-24

Table F-12. Upper-bound activities associated with experimental contaminant byproducts wastes sent to RWMC from 1960 through 1983. (These inventories are included in the INTEC-MOD-4H waste stream).

Nuclide	1962	1963	1966	1968	1969	1975
H-3	3.0E-01	8.2E-01	1.4E+00	8.7E-01	4.6E-02	9.0E-02
Be-10	3.1E-09	8.4E-09	1.5E-08	8.9E-09	4.7E-10	9.2E-10
C-14	1.2E-07	3.4E-07	5.9E-07	3.6E-07	1.9E-08	3.7E-08
Co-60	1.1E-01	3.0E-01	5.2E-01	3.2E-01	1.7E-02	3.3E-02
Ni-63	5.1E-02	1.4E-01	2.4E-01	1.5E-01	7.8E-03	1.5E-02
Sr-90	1.2E+02	3.3E+02	5.7E+02	3.5E+02	1.8E+01	3.6E+01
Nb-94	2.4E-08	6.4E-08	1.1E-07	6.8E-08	3.6E-09	7.0E-09
Tc-99	1.5E-02	4.1E-02	7.2E-02	4.4E-02	2.3E-03	4.5E-03
I-129	2.5E-05	6.8E-05	1.2E-04	7.2E-05	3.8E-06	7.4E-06
Cs-137	9.2E+01	2.5E+02	4.4E+02	2.7E+02	1.4E+01	2.7E+01
Eu-152	9.8E-03	2.7E-02	4.6E-02	2.8E-02	1.5E-03	2.9E-03
Eu-154	1.8E+00	4.9E+00	8.5E+00	5.2E+00	2.8E-01	5.4E-01
Pb-210	1.3E-13	3.6E-13	6.3E-13	3.9E-13	2.0E-14	4.0E-14
Ra-226	1.6E-12	4.2E-12	7.3E-12	4.5E-12	2.4E-13	4.6E-13
Ra-228	6.4E-14	1.7E-13	3.0E-13	1.9E-13	9.8E-15	1.9E-14
Ac-227	1.7E-08	4.7E-08	8.2E-08	5.0E-08	2.7E-09	5.2E-09
Th-228	6.6E-07	1.8E-06	3.1E-06	1.9E-06	1.0E-07	2.0E-07
Th-229	5.5E-12	1.5E-11	2.6E-11	1.6E-11	8.3E-13	1.6E-12
Th-230	8.5E-10	2.3E-09	4.0E-09	2.5E-09	1.3E-10	2.5E-10
Th-232	2.2E-13	6.1E-13	1.1E-12	6.5E-13	3.4E-14	6.6E-14
U-232	3.8E-09	1.0E-08	1.8E-08	1.1E-08	5.9E-10	1.1E-09
U-233	4.0E-11	1.1E-10	1.9E-10	1.2E-10	6.1E-12	1.2E-11
U-234	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-235	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-236	9.7E-06	2.6E-05	4.6E-05	2.8E-05	1.5E-06	2.9E-06
U-238	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Np-237	1.8E-05	4.8E-05	8.5E-05	5.2E-05	2.7E-06	5.3E-06
Pu-238	9.3E-01	2.5E+00	4.4E+00	2.7E+00	1.4E-01	2.7E-01
Pu-239	1.2E-02	3.2E-02	5.6E-02	3.4E-02	1.8E-03	3.5E-03
Pu-240	1.1E-02	2.9E-02	5.1E-02	3.1E-02	1.7E-03	3.2E-03
Pu-241	1.3E+00	3.5E+00	6.2E+00	3.8E+00	2.0E-01	3.9E-01
Pu-242	2.4E-05	6.6E-05	1.1E-04	7.0E-05	3.7E-06	7.2E-06
Pu-243	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-244	4.2E-18	1.1E-17	2.0E-17	1.2E-17	6.4E-19	1.2E-18
Am-241	5.4E-02	1.5E-01	2.5E-01	1.5E-01	8.2E-03	1.6E-02
Am-242	2.5E-08	6.7E-08	1.2E-07	7.2E-08	3.8E-09	7.4E-09
Am-243	1.4E-09	3.8E-09	6.7E-09	4.1E-09	2.2E-10	4.2E-10
Cm-242	2.1E-08	5.6E-08	9.8E-08	6.0E-08	3.1E-09	6.1E-09
Cm-243	7.0E-10	1.9E-09	3.3E-09	2.0E-09	1.1E-10	2.1E-10
Cm-244	9.2E-09	2.5E-08	4.3E-08	2.7E-08	1.4E-09	2.7E-09
Cm-245	1.2E-13	3.2E-13	5.6E-13	3.4E-13	1.8E-14	3.5E-14
Cm-246	1.8E-15	5.0E-15	8.6E-15	5.3E-15	2.8E-16	5.4E-16
Cm-247	4.4E-22	1.2E-21	2.1E-21	1.3E-21	6.7E-23	1.3E-22
Cm-248	8.6E-23	2.3E-22	4.1E-22	2.5E-22	1.3E-23	2.5E-23

F-6. WASTE CALCINING FACILITY FILTERS SENT FROM INTEC TO RWMC

Waste Calcining Facility (WCF) and related filter disposals sent to RWMC (i.e., the SDA) are classified in the INTEC-MOD-5H waste stream. This waste stream consisted of significant amounts of fission product contaminants, actinides, and trace amounts of activation products. In general, the composition of the waste disposals was variable and depended on the specific reprocessing campaign and the calcine material that was involved. In addition, the amount of activity and the radionuclide distribution contained within the WCF calcine varied, depending on the type of waste, the age of this material, and the concentration of radionuclides in the particular tank being processed. For example, wastes from the processing of aluminum fuels, zirconium fuels, the co-processing of aluminum and zirconium fuels, and stainless steel materials were considered. However, not all of the disposal data were obtained from shipping records. Some data were obtained from CPP (e.g., INTEC) production monthly reports. This information was ultimately used to quantify the early WCF disposals that were not always explicitly reported on the 110 shipping forms.

A review of the RWMIS data indicates that the reported isotopic distributions that are frequently shown in the RWMIS database are inaccurate. Reported gross activities may be reasonable, but the isotopic breakdowns are incorrect. Also, many of the contaminants of interest were not reported. Therefore, in the current analysis, the filter activity data from the RWMIS and WasteOScope databases were replaced with more detailed information from best-estimate analysis.

In order to determine the activities of some radionuclides that must have been present, but were not reported in the shipping records or in some portions of Wenzel's analysis, a set of scaling factors were calculated and referenced to the Cs-137 activity. Not all of the Waste Area Group 7 radionuclides of concern were reported by Wenzel. Notable exceptions include Cl-36, Ni-59, Pb-210, Ac-227, the thorium isotopes, Pa-231, and the curium isotopes. In addition, reverse-decay calculations were necessary in order to determine the filter activity at the time of each disposal. Also, the inventory associated with the missing radionuclides had to be determined. Except for Cl-36, all missing radionuclide data were eventually calculated from scaling factors that were estimated from a larger set of ORIGEN2 calculations, including calculations originally performed for only one type of calcine material. The scaling factor data were determined from two possible methods. Method 1 corrected the 2000 inventory data of Wenzel to the year 1986, then the activity of each radionuclide was divided by the calculated Cs-137 activity. To determine the activity of those radionuclides not included in the Method 1 analysis, a second set of scaling factors were determined from the data that only considered one type of calcine material. Since the alternate dataset (i.e., Method 2) only considered one type of calcine material, the Method 2 results are considered to be less accurate than the Method 1 results; however, the Method 2 data (also decay corrected to 1986) are useful because it includes many radionuclides not previously considered by the Method 1 analysis. The only radionuclide not considered in either method was Cl-36. In the case of Cl-36 no scaling factor data were possible due to a lack of any inventory data for this radionuclide in the calcine material. Nevertheless, the Cl-36 inventory in INTEC calcine material is believed to be negligible; at least when compared against the Cl-36 inventory in activated metal. The best-estimate scaling factors were then determined from a combination of the two alternative methods. Method 1, representing the more reliable data, was accepted as the best-estimate values whenever possible. However, when no data from Method 1 was available, then the Method 2 values were accepted.

Table F-13. Best-estimate activities associated with Waste Calcining Facility filter disposals sent to RWMC from 1960 through 1983.
 (These inventories are included in the INTEC-MOD-5H waste stream).

Filter numbers <u>Nuclide</u>	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
	(Ci)	(Ci)	(Ci)	(Ci)	1 - 12 (Ci)	none (Ci)	13 - 17 (Ci)	18 - 32 (Ci)	33 - 36 (Ci)	37 - 44 (Ci)	45 (Ci)
H3					1.97E+00	0.00E+00	5.14E-01	1.66E+00	2.05E-01	6.95E-01	2.75E-02
C14					1.65E-08	0.00E+00	4.38E-09	1.32E-08	6.00E-10	4.36E-09	8.10E-11
Cl36					6.64E-07	0.00E+00	1.75E-07	5.44E-07	2.45E-08	1.76E-07	3.31E-09
Co60					no data*						
Ni59					0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.03E-01	5.06E-01	5.17E-02
Ni63					1.80E-03	0.00E+00	4.69E-04	1.49E-03	1.01E-04	5.11E-04	1.34E-05
SR90					0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.15E-02	1.51E-02	1.60E-03
NB94					5.19E+02	0.00E+00	1.36E+02	4.27E+02	4.06E+01	1.65E+02	5.36E+00
TC99					1.30E-07	0.00E+00	3.38E-08	1.05E-07	4.81E-09	3.41E-08	6.21E-10
I129					8.20E-02	0.00E+00	2.14E-02	6.76E-02	3.00E-03	2.16E-02	4.00E-04
CS137					1.31E-04	0.00E+00	3.50E-05	1.09E-04	4.80E-06	3.41E-05	6.60E-07
EU152					5.38E+02	0.00E+00	1.40E+02	4.45E+02	3.01E+01	1.53E+02	3.99E+00
EU154					2.03E-02	0.00E+00	5.30E-03	1.69E-02	5.97E-03	1.18E-02	7.90E-04
PB210					5.24E+00	0.00E+00	1.37E+00	4.25E+00	2.11E+00	3.80E+00	2.81E-01
RA226					1.40E-09	0.00E+00	3.65E-10	1.16E-09	7.84E-11	3.98E-10	1.04E-11
RA228					2.70E-07	0.00E+00	7.00E-08	2.26E-07	2.11E-10	5.90E-08	2.43E-11
AC227					3.24E-10	0.00E+00	8.44E-11	2.62E-10	2.08E-12	7.22E-11	2.75E-13
TH228					5.14E-08	0.00E+00	1.34E-08	4.25E-08	2.88E-09	1.46E-08	3.82E-10
TH229					9.23E-03	0.00E+00	2.40E-03	7.63E-03	5.17E-04	2.62E-03	6.85E-05
TH230					4.25E-10	0.00E+00	1.11E-10	3.52E-10	2.38E-11	1.21E-10	3.16E-12
TH232					7.42E-07	0.00E+00	1.93E-07	6.14E-07	4.15E-08	2.11E-07	5.51E-09
PA231					1.39E-12	0.00E+00	3.63E-13	1.15E-12	7.80E-14	3.96E-13	1.03E-14

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Filter numbers					1 - 12	none	13 - 17	18 - 32	33 - 36	37 - 44	45
Nuclide	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)	(Ci)
U232					1.35E-07	0.00E+00	3.52E-08	1.12E-07	7.57E-09	3.84E-08	1.00E-09
U233					5.13E-08	0.00E+00	1.35E-08	4.14E-08	1.10E-08	2.49E-08	1.49E-09
U234					3.57E-08	0.00E+00	8.80E-09	2.60E-08	5.20E-10	7.21E-09	6.30E-11
U235					6.66E-04	0.00E+00	1.74E-04	5.42E-04	1.08E-04	2.82E-04	1.50E-05
U236					4.58E-06	0.00E+00	1.20E-06	3.79E-06	7.20E-07	1.92E-06	9.80E-08
U238					1.05E-05	0.00E+00	2.82E-06	8.69E-06	1.92E-06	4.84E-06	2.60E-07
NP237					2.61E-07	0.00E+00	6.90E-08	2.15E-07	3.60E-08	1.02E-07	4.80E-09
PU238					2.24E-04	0.00E+00	5.98E-05	1.86E-04	3.60E-06	5.26E-05	4.80E-07
PU239					1.27E-01	0.00E+00	3.38E-02	1.04E-01	2.16E-01	3.02E-01	2.92E-02
PU240					1.11E-02	0.00E+00	2.82E-03	8.85E-03	2.32E-03	5.34E-03	3.10E-04
PU241					4.33E-03	0.00E+00	1.13E-03	3.50E-03	2.17E-03	3.69E-03	2.91E-04
PU242					4.88E-01	0.00E+00	1.29E-01	4.02E-01	7.51E-01	1.05E+00	9.80E-02
Pu244					3.26E-07	0.00E+00	8.60E-08	2.60E-07	4.80E-06	6.15E-06	6.40E-07
AM241					9.61E-15	0.00E+00	2.55E-15	7.95E-15	8.40E-19	2.20E-15	1.10E-19
AM243					2.42E-02	0.00E+00	6.23E-03	1.98E-02	2.14E-02	3.17E-02	2.82E-03
Cm243					8.61E-08	0.00E+00	2.26E-08	7.00E-08	2.81E-10	1.90E-08	3.71E-11
CM244					4.77E-05	0.00E+00	1.24E-05	3.94E-05	2.67E-06	1.35E-05	3.54E-07
CM245					2.93E-03	0.00E+00	7.64E-04	2.43E-03	1.64E-04	8.33E-04	2.18E-05
CM246					2.65E-07	0.00E+00	6.90E-08	2.19E-07	1.48E-08	7.53E-08	1.97E-09
CM247					2.10E-08	0.00E+00	5.48E-09	1.74E-08	1.18E-09	5.98E-09	1.56E-10
CM248					2.72E-14	0.00E+00	7.08E-15	2.25E-14	1.52E-15	7.72E-15	2.02E-16
Totals =					1.07E+03	0.00E+00	2.78E+02	8.79E+02	7.45E+01	3.25E+02	9.84E+00

Filter numbers												Total
	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	
Nuclide	(Ci)											
H3	4.49E-01	6.90E-01	6.39E-01	8.19E-01	5.14E-01	4.16E-01	5.32E-01	2.46E+00	9.87E-01	1.05E+00	9.37E-01	1.46E+01
C14	1.28E-09	2.61E-09	1.85E-09	4.21E-09	1.54E-09	3.96E-09	4.98E-09	2.71E-08	1.10E-08	4.44E-09	2.74E-09	1.05E-07
Cl36	5.30E-08	1.03E-07	7.45E-08	1.70E-07	6.25E-08	1.62E-07	1.99E-07	1.08E-06	4.40E-07	1.81E-07	1.13E-07	4.23E-06
Co60	no data*											
Ni59	8.34E-01	1.10E+00	1.19E+00	9.47E-01	9.93E-01	1.83E-01	2.35E-01	7.69E-01	2.83E-01	1.73E+00	1.82E+00	1.10E+01
Ni63	2.14E-04	3.81E-04	3.10E-04	5.42E-04	2.54E-04	4.19E-04	5.11E-04	2.56E-03	1.06E-03	6.10E-04	4.65E-04	1.17E-02
SR90	2.54E-02	3.28E-02	3.57E-02	2.79E-02	3.00E-02	4.32E-02	5.39E-02	1.76E-01	6.51E-02	5.88E-02	5.43E-02	6.32E-01
NB94	8.69E+01	1.42E+02	1.24E+02	1.84E+02	1.02E+02	1.18E+02	1.43E+02	7.25E+02	3.04E+02	2.27E+02	1.86E+02	3.64E+03
TC99	9.61E-09	1.98E-08	1.40E-08	3.26E-08	1.19E-08	2.94E-08	3.68E-08	2.05E-07	8.36E-08	3.44E-08	2.13E-08	8.06E-07
I129	6.48E-03	1.30E-02	9.00E-03	2.08E-02	7.70E-03	1.86E-02	2.36E-02	1.31E-01	5.34E-02	2.21E-02	1.38E-02	5.15E-01
CS137	1.04E-05	2.13E-05	1.48E-05	3.38E-05	1.26E-05	3.12E-05	3.86E-05	2.14E-04	8.65E-05	3.59E-05	2.26E-05	8.37E-04
EU152	6.40E+01	1.14E+02	9.26E+01	1.62E+02	7.60E+01	1.25E+02	1.53E+02	7.65E+02	3.17E+02	1.82E+02	1.39E+02	3.50E+03
EU154	1.27E-02	1.77E-02	1.83E-02	1.78E-02	1.51E-02	1.37E-02	1.70E-02	6.33E-02	2.41E-02	2.93E-02	2.73E-02	3.18E-01
PB210	4.48E+00	6.04E+00	6.42E+00	5.90E+00	5.26E+00	1.87E+00	2.31E+00	9.08E+00	3.55E+00	9.67E+00	9.77E+00	8.14E+01
RA226	1.67E-10	2.97E-10	2.41E-10	4.22E-10	1.98E-10	3.26E-10	3.98E-10	1.99E-09	8.25E-10	4.75E-10	3.62E-10	9.11E-09
RA228	3.73E-10	1.56E-08	4.57E-10	4.53E-08	3.25E-10	1.15E-09	1.33E-09	1.85E-07	8.38E-08	2.10E-08	3.42E-10	9.80E-07
AC227	4.49E-12	2.37E-11	6.17E-12	5.89E-11	5.13E-12	3.90E-12	4.32E-12	7.59E-11	3.32E-11	1.66E-11	9.17E-12	9.86E-10
TH228	6.12E-09	1.09E-08	8.85E-09	1.55E-08	7.26E-09	1.20E-08	1.46E-08	7.32E-08	3.03E-08	1.74E-08	1.33E-08	3.35E-07
TH229	1.10E-03	1.96E-03	1.59E-03	2.78E-03	1.30E-03	2.15E-03	2.62E-03	1.31E-02	5.44E-03	3.13E-03	2.38E-03	6.01E-02
TH230	5.06E-11	9.01E-11	7.32E-11	1.28E-10	6.01E-11	9.90E-11	1.21E-10	6.05E-10	2.51E-10	1.44E-10	1.10E-10	2.77E-09
TH232	8.82E-08	1.57E-07	1.28E-07	2.23E-07	1.05E-07	1.73E-07	2.11E-07	1.06E-06	4.37E-07	2.51E-07	1.92E-07	4.83E-06
PA231	1.66E-13	2.95E-13	2.40E-13	4.20E-13	1.97E-13	3.24E-13	3.96E-13	1.98E-12	8.21E-13	4.73E-13	3.60E-13	9.07E-12

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	
Filter numbers	46 - 53 (Ci)	54 - 60 (Ci)	61 - 68 (Ci)	69 - 80 (Ci)	81 - 87 (Ci)	88 - 93 (Ci)	94 - 101 (Ci)	102 - 136 (Ci)	137 - 152 (Ci)	153 - 166 (Ci)	167 - 183 (Ci)	Sum (Ci)
Nuclide												
U232	2.36E-08	3.39E-08	3.40E-08	3.51E-08	2.79E-08	1.22E-05	1.54E-05	4.88E-05	1.80E-05	1.52E-06	5.10E-08	9.63E-05
U233	9.60E-10	2.86E-09	1.32E-09	5.26E-09	9.80E-10	1.02E-09	1.22E-09	2.50E-08	1.07E-08	3.82E-09	1.39E-09	1.33E-07
U234	2.32E-04	3.37E-04	3.28E-04	3.67E-04	2.66E-04	5.34E-04	6.70E-04	2.59E-03	1.00E-03	5.83E-04	4.76E-04	9.17E-03
U235	1.60E-06	2.30E-06	2.22E-06	2.49E-06	1.82E-06	3.30E-06	4.10E-06	1.63E-05	6.31E-06	4.07E-06	3.39E-06	6.02E-05
U236	4.08E-06	5.94E-06	5.84E-06	6.39E-06	4.83E-06	8.40E-06	1.06E-05	4.27E-05	1.59E-05	1.05E-05	8.80E-06	1.53E-04
U238	7.68E-08	1.17E-07	1.11E-07	1.31E-07	9.10E-08	1.62E-07	2.04E-07	8.29E-07	3.19E-07	1.99E-07	1.64E-07	3.09E-06
NP237	7.60E-06	2.32E-05	1.11E-05	4.62E-05	9.10E-06	1.20E-06	1.46E-06	1.55E-04	6.99E-05	3.31E-05	1.62E-05	9.00E-04
PU238	4.63E-01	6.14E-01	6.61E-01	5.47E-01	5.46E-01	7.98E-01	9.62E-01	3.16E+00	1.18E+00	1.08E+00	9.95E-01	1.18E+01
PU239	4.96E-03	7.22E-03	7.12E-03	7.41E-03	5.88E-03	1.02E-02	1.30E-02	5.04E-02	1.95E-02	1.26E-02	1.07E-02	1.80E-01
PU240	4.57E-03	6.26E-03	6.60E-03	5.87E-03	5.40E-03	9.62E-03	1.16E-02	4.11E-02	1.59E-02	1.13E-02	9.95E-03	1.43E-01
PU241	1.59E+00	2.12E+00	2.29E+00	1.87E+00	1.87E+00	7.46E-01	9.42E-01	3.27E+00	1.22E+00	3.36E+00	3.46E+00	2.57E+01
PU242	1.04E-05	1.32E-05	1.48E-05	1.16E-05	1.19E-05	2.22E-05	2.78E-05	8.96E-05	3.33E-05	2.36E-05	2.16E-05	2.92E-04
Pu244	1.76E-18	5.52E-16	2.51E-18	1.60E-15	2.10E-18	5.52E-13	6.88E-13	2.25E-12	8.30E-13	6.85E-14	3.80E-18	4.41E-12
AM241	4.33E-02	5.72E-02	6.08E-02	5.06E-02	4.81E-02	2.78E-02	3.38E-02	1.25E-01	4.70E-02	8.17E-02	7.64E-02	7.58E-01
AM243	6.02E-10	5.59E-09	8.81E-10	1.52E-08	7.02E-10	2.41E-04	3.03E-04	9.77E-04	3.64E-04	3.01E-05	1.27E-09	1.91E-03
Cm243	5.67E-06	1.01E-05	8.21E-06	1.44E-05	6.73E-06	1.11E-05	1.36E-05	6.78E-05	2.81E-05	1.62E-05	1.23E-05	3.10E-04
CM244	3.49E-04	6.21E-04	5.05E-04	8.83E-04	4.14E-04	6.82E-04	8.33E-04	4.17E-03	1.73E-03	9.94E-04	7.57E-04	1.91E-02
CM245	3.15E-08	5.62E-08	4.56E-08	7.98E-08	3.74E-08	6.17E-08	7.53E-08	3.77E-07	1.56E-07	8.98E-08	6.85E-08	1.72E-06
CM246	2.50E-09	4.46E-09	3.62E-09	6.34E-09	2.97E-09	4.90E-09	5.98E-09	2.99E-08	1.24E-08	7.13E-09	5.44E-09	1.37E-07
CM247	3.23E-15	5.76E-15	4.68E-15	8.19E-15	3.84E-15	6.33E-15	7.73E-15	3.87E-14	1.60E-14	9.21E-15	7.02E-15	1.77E-13
CM248	3.93E-15	7.00E-15	5.68E-15	9.94E-15	4.66E-15	7.68E-15	9.38E-15	4.70E-14	1.94E-14	1.12E-14	8.53E-15	2.15E-13
Totals =	1.59E+02	2.67E+02	2.28E+02	3.56E+02	1.88E+02	2.47E+02	3.01E+02	1.51E+03	6.29E+02	4.26E+02	3.42E+02	7.28E+03

F-7. CPP-603 BASIN SLUDGE DISPOSALS

This sludge material was extracted from the fuel storage basins at CPP-603. After treatment, the dewatered sludge was sent to the SDA in 43 separate shipments from 1977 through 1980. Other related waste streams from the basins at CPP-603 proved to be insignificant in relation to the reported sludge disposals. This waste stream was identified as INTEC-MOD-6H. The principal contaminants in this waste stream included fission products, actinides, and activation products. It was concluded that this waste stream was isotopically unique and did not easily match nuclide distributions from other waste streams. A brief history of this waste stream follows.

Over a period of 26 years, fuel corrosion and other related events released fuel nuclides, some of which settled on the basin floors. This accumulation, along with wind-blown dust, eventually formed a sludge layer 5 to 10 cm (2 to 4 in.) thick on the bottom of the basin floor. The basin debris is made of three different types: fissile fuel fragments, irradiated metal fragments, and miscellaneous material. The sludge also had ion-exchange properties allowing it to absorb radionuclides already dissolved in the basin water system. Eventually, the sludge became a hazard to personnel and was removed from the basins using a specially designed underwater vacuum system. Later this stored sludge was pumped into 18 metric ton steel-lined vaults, where it was dried and solidified. These vaults were sealed and then buried at the SDA.

To reassess the contaminants reported in RWMIS and the HDT and RPDT, other supporting documents were located to identify data on nuclide assays from sludge (Smith 1974). First, the 1973 assay data were used to crosscheck reported total activities and isotopic profiles in the HDT and RPDT. Second, net weights of the contaminated sludge were cross-checked with reported weights of disposed sludge. The weights of the basin sludge disposal directly correlated with the net activities sent to the SDA. Additionally, cleanup systems using both resin and diatomaceous earth were used for the water purification systems in the basins at CPP-603. However, the gross activities of these disposals were only a small fraction of the net activity disposals for the sludge burials. The reassessment concludes that net reported actinide contaminant activities were under-estimated and that fission contaminants were over-calculated. These results combine known data about concentrations of sludge assay contaminants from the storage basins with estimated amounts of sludge actually sent to the SDA.

Table F-14. Best-estimate activities associated with sludge disposals sent to RWMC from 1977 through 1980. (These inventories are included in the INTEC-MOD-6H waste stream).

Nuclide	1977 (Ci)	1978 (Ci)	1979 (Ci)	1980 (Ci)
H-3	2.594618	1.2E+00	5.8E-01	7.5E+00
Be-10	3.5E-08	1.5E-08	7.7E-09	1.0E-07
C-14	2.5E-03	1.1E-03	5.5E-04	7.1E-03
Cl-36	1.3E-06	5.9E-07	3.0E-07	3.8E-06
Co-60	1.5E+02	6.8E+01	3.4E+01	4.4E+02
Ni-59	1.4E-02	6.0E-03	3.0E-03	3.9E-02
Ni-63	1.0E+00	4.5E-01	2.2E-01	2.9E+00
Sr-90	9.2E+02	4.1E+02	2.1E+02	2.7E+03
Nb-94	5.6E-04	2.5E-04	1.2E-04	1.6E-03
Tc-99	1.8E-01	8.0E-02	4.0E-02	5.2E-01
I-129	2.9E-04	1.3E-04	6.5E-05	8.4E-04
Cs-137	9.1E+02	4.1E+02	2.0E+02	2.6E+03
Eu-152	6.5E-02	2.9E-02	1.4E-02	1.9E-01
Eu-154	1.2E+01	5.3E+00	2.6E+00	3.4E+01
Pb-210	4.2E-10	1.8E-10	9.2E-11	1.2E-09
Ra-226	1.0E-08	4.6E-09	2.3E-09	3.0E-08
Ra-228	6.7E-14	3.0E-14	1.5E-14	1.9E-13
Ac-227	5.9E-08	2.6E-08	1.3E-08	1.7E-07
Th-228	4.6E-05	2.0E-05	1.0E-05	1.3E-04
Th-229	1.3E-09	5.6E-10	2.8E-10	3.7E-09
Th-230	1.2E-05	5.4E-06	2.7E-06	3.5E-05
Th-232	4.0E-13	1.8E-13	9.0E-14	1.2E-12
Pa-231	9.7E-07	4.3E-07	2.2E-07	2.8E-06
U-232	6.4E-05	2.9E-05	1.4E-05	1.9E-04
U-233	2.4E-06	1.1E-06	5.4E-07	7.0E-06
U-234	3.4E-01	1.5E-01	7.6E-02	9.9E-01
U-235	1.2E-02	5.2E-03	2.6E-03	3.4E-02
U-236	2.3E-03	1.0E-03	5.0E-04	6.6E-03
U-238	1.6E-03	7.3E-04	3.6E-04	4.7E-03
Np-237	1.7E-04	7.6E-05	3.8E-05	4.9E-04
Pu-238	2.3E-02	1.0E-02	5.0E-03	6.5E-02
Pu-239	9.2E-01	4.1E-01	2.0E-01	2.6E+00
Pu-240	6.8E-03	3.0E-03	1.5E-03	2.0E-02
Pu-241	4.1E-03	1.8E-03	9.1E-04	1.2E-02
Pu-242	1.7E-10	7.6E-11	3.8E-11	5.0E-10
Pu-244	2.0E-21	8.9E-22	4.4E-22	5.8E-21
Am-241	2.3E-05	1.0E-05	5.1E-06	6.6E-05
Am-243	7.1E-12	3.1E-12	1.6E-12	2.0E-11
Cm-243	1.7E-11	7.4E-12	3.7E-12	4.8E-11
Cm-244	3.6E-12	1.6E-12	8.0E-13	1.0E-11
Cm-245	8.8E-18	3.9E-18	1.9E-18	2.5E-17
Cm-246	5.2E-21	2.3E-21	1.2E-21	1.5E-20
Cm-247	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-248	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table F-15. Upper-bound activities associated with sludge disposals sent to RWMC from 1977 through 1980. (These inventories are included in the INTEC-MOD-6H waste stream).

Nuclide	1977 (Ci)	1978 (Ci)	1979 (Ci)	1980 (Ci)
H- 3	6.803996	3.0E+00	1.5E+00	2.0E+01
Be-10	9.1E-08	4.0E-08	2.0E-08	2.6E-07
C-14	1.5E-02	6.7E-03	3.4E-03	4.4E-02
Cl-36	8.1E-06	3.6E-06	1.8E-06	2.3E-05
Co-60	9.3E+02	4.1E+02	2.1E+02	2.7E+03
Ni-59	7.2E-02	3.2E-02	1.6E-02	2.1E-01
Ni-63	5.4E+00	2.4E+00	1.2E+00	1.6E+01
Sr-90	2.4E+03	1.1E+03	5.4E+02	7.0E+03
Nb-94	3.4E-03	1.5E-03	7.6E-04	9.9E-03
Tc-99	4.8E-01	2.1E-01	1.1E-01	1.4E+00
I-129	7.7E-04	3.4E-04	1.7E-04	2.2E-03
Cs-137	2.4E+03	1.1E+03	5.3E+02	6.9E+03
Eu-152	1.7E-01	7.5E-02	3.8E-02	4.9E-01
Eu-154	3.1E+01	1.4E+01	6.9E+00	9.0E+01
Pb-210	8.0E-10	3.6E-10	1.8E-10	2.3E-09
Ra-226	2.0E-08	8.9E-09	4.4E-09	5.8E-08
Ra-228	1.3E-13	5.8E-14	2.9E-14	3.8E-13
Ac-227	1.1E-07	5.1E-08	2.5E-08	3.3E-07
Th-228	8.9E-05	4.0E-05	2.0E-05	2.6E-04
Th-229	2.5E-09	1.1E-09	5.5E-10	7.1E-09
Th-230	2.3E-05	1.0E-05	5.2E-06	6.8E-05
Th-232	7.8E-13	3.5E-13	1.7E-13	2.3E-12
Pa231	1.9E-06	8.4E-07	4.2E-07	5.4E-06
U-232	1.2E-04	5.5E-05	2.8E-05	3.6E-04
U-233	4.7E-06	2.1E-06	1.0E-06	1.4E-05
U-234	6.6E-01	2.9E-01	1.5E-01	1.9E+00
U-235	2.2E-02	1.0E-02	5.0E-03	6.5E-02
U-236	4.4E-03	2.0E-03	9.8E-04	1.3E-02
U-238	3.2E-03	1.4E-03	7.1E-04	9.2E-03
Np-237	3.3E-04	1.5E-04	7.4E-05	9.6E-04
Pu-238	4.4E-02	1.9E-02	9.7E-03	1.3E-01
Pu-239	1.8E+00	7.9E-01	3.9E-01	5.1E+00
Pu-240	1.3E-02	5.9E-03	2.9E-03	3.8E-02
Pu-241	7.9E-03	3.5E-03	1.8E-03	2.3E-02
Pu-242	3.3E-10	1.5E-10	7.4E-11	9.6E-10
Pu-244	3.9E-21	1.7E-21	8.6E-22	1.1E-20
Am-241	4.4E-05	2.0E-05	9.8E-06	1.3E-04
Am-243	1.4E-11	6.1E-12	3.0E-12	3.9E-11
Cm-243	3.2E-11	1.4E-11	7.2E-12	9.3E-11
Cm-244	7.0E-12	3.1E-12	1.6E-12	2.0E-11
Cm-245	1.7E-17	7.5E-18	3.8E-18	4.9E-17
Cm-246	1.0E-20	4.5E-21	2.2E-21	2.9E-20
Cm-247	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-248	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table F-16. Lower-bound activities associated with sludge disposals sent to RWMC from 1977 through 1980. (These inventories are included in the INTEC-MOD-6H waste stream).

Nuclide	1977 (Ci)	1978 (Ci)	1979 (Ci)	1980 (Ci)
H- 3	0.49694	2.2E-01	1.1E-01	1.4E+00
Be-10	6.7E-09	3.0E-09	1.5E-09	1.9E-08
C-14	5.5E-04	2.5E-04	1.2E-04	1.6E-03
Cl-36	3.0E-07	1.3E-07	6.6E-08	8.6E-07
Co-60	3.4E+01	1.5E+01	7.6E+00	9.9E+01
Ni-59	2.9E-03	1.3E-03	6.5E-04	8.4E-03
Ni-63	2.2E-01	9.7E-02	4.8E-02	6.3E-01
Sr-90	1.8E+02	7.9E+01	3.9E+01	5.1E+02
Nb-94	1.3E-04	5.6E-05	2.8E-05	3.6E-04
Tc-99	3.5E-02	1.5E-02	7.7E-03	1.0E-01
I-129	5.6E-05	2.5E-05	1.2E-05	1.6E-04
Cs-137	1.7E+02	7.8E+01	3.9E+01	5.0E+02
Eu-152	1.2E-02	5.5E-03	2.8E-03	3.6E-02
Eu-154	2.3E+00	1.0E+00	5.0E-01	6.5E+00
Pb-210	1.5E-10	6.8E-11	3.4E-11	4.4E-10
Ra-226	3.8E-09	1.7E-09	8.4E-10	1.1E-08
Ra-228	2.5E-14	1.1E-14	5.5E-15	7.1E-14
Ac-227	2.2E-08	9.6E-09	4.8E-09	6.2E-08
Th-228	1.7E-05	7.5E-06	3.7E-06	4.9E-05
Th-229	4.7E-10	2.1E-10	1.0E-10	1.3E-09
Th-230	4.4E-06	2.0E-06	9.8E-07	1.3E-05
Th-232	1.5E-13	6.6E-14	3.3E-14	4.3E-13
Pa231	3.6E-07	1.6E-07	7.9E-08	1.0E-06
U-232	2.4E-05	1.0E-05	5.2E-06	6.8E-05
U-233	8.9E-07	4.0E-07	2.0E-07	2.6E-06
U-234	1.3E-01	5.6E-02	2.8E-02	3.6E-01
U-235	4.2E-03	1.9E-03	9.4E-04	1.2E-02
U-236	8.3E-04	3.7E-04	1.8E-04	2.4E-03
U-238	6.0E-04	2.7E-04	1.3E-04	1.7E-03
Np-237	6.3E-05	2.8E-05	1.4E-05	1.8E-04
Pu-238	8.2E-03	3.7E-03	1.8E-03	2.4E-02
Pu-239	3.4E-01	1.5E-01	7.4E-02	9.7E-01
Pu-240	2.5E-03	1.1E-03	5.5E-04	7.2E-03
Pu-241	1.5E-03	6.6E-04	3.3E-04	4.3E-03
Pu-242	6.3E-11	2.8E-11	1.4E-11	1.8E-10
Pu-244	7.3E-22	3.3E-22	1.6E-22	2.1E-21
Am-241	8.4E-06	3.7E-06	1.9E-06	2.4E-05
Am-243	2.6E-12	1.1E-12	5.7E-13	7.5E-12
Cm-243	6.1E-12	2.7E-12	1.4E-12	1.8E-11
Cm-244	1.3E-12	5.9E-13	2.9E-13	3.8E-12
Cm-245	3.2E-18	1.4E-18	7.1E-19	9.3E-18
Cm-246	1.9E-21	8.5E-22	4.2E-22	5.5E-21
Cm-247	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-248	0.0E+00	0.0E+00	0.0E+00	0.0E+00

F-8. TANK FARM CONTAMINATED SOIL DISPOSALS

Typically this class of soil disposals was associated with large-scale excavations of contaminated Tank Farm sites, with the removed dirt being sent to the SDA. This waste stream is INTEC-MOD-7H. The principal contaminants in this waste stream included significant amounts of fission products with actinides and traces of activation products.

Approximately 3.6E3 metric tons of contaminated soil sent from INTEC to the SDA was associated with Tank Farm leaks. None of the leaks came from a breach of the eleven tanks that stored liquid raffinates, but from transfer lines that interconnected these tanks to each other or to other plant reprocessing facilities. Of the approximately 5.7E3 Ci reportedly sent to the SDA from 1974 through 1983, about 97% of the activity was associated with two releases of high-level waste (HLW) liquid raffinate from the mid 1970s. Other much smaller secondary sources of contaminated soil were associated with related ground releases of Tank Farm low-level waste (LLW) liquid. Shipping information from RWMIS showed that 3.6E3 metric tons of contaminated dirt were sent to the SDA from 1974 through 1983. This mass of soil includes, in many cases, both excavated contaminated dirt and uncontaminated dirt with which it was mixed to minimize radiation field exposure during transport to the SDA.

Known shipping data was cross-checked with other external documents for consistency in reporting the contaminated soil activities sent to the SDA. It proved impractical to analyze all known soil shipments of contaminated soil connected with LLW releases. Consequently, these reported disposals were isotopically scaled to the dominant HLW activities for disposals connected with large-scale excavations. Again most of the activity of interest was sent to the SDA from 1974 through 1975.

Because of limited information associated with shipping manifests, the reassessed contaminant profiles were calculated using estimated volumes of leaked HLW raffinates that were released in two incidents in 1974. The first event was discovery of a broken transfer line in 1974. Estimates were that no more than 100 gal of HLW were released to the surrounding soil. A second breached line was discovered with an estimated 3,600-gal release of HLW. Unlike the first leak, the second leak was the consequence of a small hole that had been in the transfer line since 1955. Excavation and clean up of these two sites was extensive. Disposals from the first cleanup site was finished in 1983. The second spill site was only partially excavated because of high radiation fields. After the excavations were completed, these sites were backfilled with uncontaminated earth.

Table F-17. Best-estimate activities associated with soil disposals sent to RWMC from 1974 through 1983. (These inventories are included in the INTEC-MOD-7H waste stream).

Nuclide	1974 (Ci)	1975 (Ci)	1976 (Ci)	1977 (Ci)	1978 (Ci)	1983 (Ci)
H- 3	5.4E+00	2.2E+00	6.9E-02	1.6E-01	3.6E-02	3.6E-02
Be-10	7.3E-08	2.9E-08	9.2E-10	2.1E-09	4.8E-10	4.8E-10
C-14	3.1E-06	1.2E-06	3.9E-08	8.9E-08	2.0E-08	2.0E-08
Cl-36						
Co-60	2.4E+00	9.5E-01	3.0E-02	6.9E-02	1.6E-02	1.6E-02
Ni-59	6.4E-03	2.6E-03	8.1E-05	1.9E-04	4.2E-05	4.2E-05
Ni-63	4.3E-01	1.7E-01	5.5E-03	1.3E-02	2.9E-03	2.8E-03
Sr-90	1.9E+03	7.7E+02	2.5E+01	5.6E+01	1.3E+01	1.3E+01
Nb-94	5.9E-07	2.4E-07	7.5E-09	1.7E-08	3.9E-09	3.9E-09
Tc-99	3.8E-01	1.5E-01	4.8E-03	1.1E-02	2.5E-03	2.5E-03
I-129	6.1E-04	2.4E-04	7.7E-06	1.8E-05	4.1E-06	4.0E-06
Cs-137	1.9E+03	7.6E+02	2.4E+01	5.5E+01	1.3E+01	1.3E+01
Eu-152	1.4E-01	5.4E-02	1.7E-03	3.9E-03	9.0E-04	8.9E-04
Eu-154	2.5E+01	9.9E+00	3.1E-01	7.2E-01	1.6E-01	1.6E-01
Pb-210	5.0E-09	2.0E-09	6.3E-11	1.4E-10	3.3E-11	3.3E-11
Ra-226	7.0E-07	2.8E-07	8.9E-09	2.0E-08	4.7E-09	4.6E-09
Ra-228	1.1E-10	4.2E-11	1.3E-12	3.1E-12	7.0E-13	7.0E-13
Ac-227	1.8E-07	7.3E-08	2.3E-09	5.3E-09	1.2E-09	1.2E-09
Th-228	3.3E-02	1.3E-02	4.1E-04	9.5E-04	2.2E-04	2.1E-04
Th-229	1.5E-09	6.0E-10	1.9E-11	4.4E-11	1.0E-11	9.9E-12
Th-230	2.6E-06	1.1E-06	3.3E-08	7.6E-08	1.7E-08	1.7E-08
Th-232	4.9E-12	2.0E-12	6.3E-14	1.4E-13	3.3E-14	3.2E-14
Pa-231	4.8E-07	1.9E-07	6.1E-09	1.4E-08	3.2E-09	3.1E-09
U-232	6.6E-05	2.6E-05	8.4E-07	1.9E-06	4.4E-07	4.3E-07
U-233	9.4E-08	3.8E-08	1.2E-09	2.7E-09	6.3E-10	6.2E-10
U-234	6.7E-03	2.7E-03	8.5E-05	1.9E-04	4.4E-05	4.4E-05
U-235	4.4E-05	1.7E-05	5.5E-07	1.3E-06	2.9E-07	2.9E-07
U-236	1.1E-04	4.4E-05	1.4E-06	3.2E-06	7.2E-07	7.2E-07
U-238	2.3E-06	9.0E-07	2.9E-08	6.6E-08	1.5E-08	1.5E-08
Np-237	6.5E-04	2.6E-04	8.3E-06	1.9E-05	4.3E-06	4.3E-06
Pu-238	7.9E+00	3.2E+00	1.0E-01	2.3E-01	5.3E-02	5.2E-02
Pu-239	1.3E-01	5.2E-02	1.7E-03	3.8E-03	8.7E-04	8.6E-04
Pu-240	1.0E-01	4.1E-02	1.3E-03	3.0E-03	6.8E-04	6.7E-04
Pu-241	1.2E+01	4.6E+00	1.5E-01	3.4E-01	7.7E-02	7.6E-02
Pu-242	2.1E-04	8.4E-05	2.7E-06	6.1E-06	1.4E-06	1.4E-06
Pu-244	3.2E-12	1.3E-12	4.1E-14	9.3E-14	2.1E-14	2.1E-14
Am-241	5.6E-01	2.3E-01	7.2E-03	1.6E-02	3.7E-03	3.7E-03
Am-243	5.3E-03	2.1E-03	6.8E-05	1.6E-04	3.5E-05	3.5E-05
Cm-243	1.7E-04	6.8E-05	2.1E-06	4.9E-06	1.1E-06	1.1E-06
Cm-244	1.0E-02	4.2E-03	1.3E-04	3.0E-04	6.9E-05	6.8E-05
Cm-245	9.4E-07	3.8E-07	1.2E-08	2.7E-08	6.2E-09	6.2E-09
Cm-246	7.5E-08	3.0E-08	9.5E-10	2.2E-09	4.9E-10	4.9E-10
Cm-247	9.6E-14	3.9E-14	1.2E-15	2.8E-15	6.4E-16	6.3E-16
Cm-248	1.2E-13	4.7E-14	1.5E-15	3.4E-15	7.8E-16	7.7E-16

Table F-18. Upper-bound activities associated with soil disposals sent to RWMC from 1974 through 1983. (These inventories are included in the INTEC-MOD-7H waste stream).

Nuclide	1974 (Ci)	1975 (Ci)	1976 (Ci)	1977 (Ci)	1978 (Ci)	1983 (Ci)
H- 3	1.8E+01	7.3E+00	2.3E-01	5.3E-01	1.2E-01	1.2E-01
Be-10	2.4E-07	9.8E-08	3.1E-09	7.1E-09	1.6E-09	1.6E-09
C-14	1.0E-05	4.1E-06	1.3E-07	3.0E-07	6.8E-08	6.7E-08
Cl-36						
Co-60	8.0E+00	3.2E+00	1.0E-01	2.3E-01	5.3E-02	5.3E-02
Ni-59	2.1E-02	8.6E-03	2.7E-04	6.2E-04	1.4E-04	1.4E-04
Ni-63	1.5E+00	5.8E-01	1.8E-02	4.2E-02	9.6E-03	9.5E-03
Sr-90	6.5E+03	2.6E+03	8.2E+01	1.9E+02	4.3E+01	4.3E+01
Nb-94	2.0E-06	7.9E-07	2.5E-08	5.7E-08	1.3E-08	1.3E-08
Tc-99	1.3E+00	5.1E-01	1.6E-02	3.7E-02	8.4E-03	8.3E-03
I-129	2.0E-03	8.2E-04	2.6E-05	6.0E-05	1.4E-05	1.3E-05
Cs-137	6.4E+03	2.6E+03	8.1E+01	1.9E+02	4.2E+01	4.2E+01
Eu-152	4.5E-01	1.8E-01	5.8E-03	1.3E-02	3.0E-03	3.0E-03
Eu-154	8.3E+01	3.3E+01	1.1E+00	2.4E+00	5.5E-01	5.5E-01
Pb-210	1.7E-08	6.7E-09	2.1E-10	4.8E-10	1.1E-10	1.1E-10
Ra-226	2.4E-06	9.4E-07	3.0E-08	6.9E-08	1.6E-08	1.5E-08
Ra-228	3.6E-10	1.4E-10	4.5E-12	1.0E-11	2.4E-12	2.3E-12
Ac-227	6.1E-07	2.4E-07	7.8E-09	1.8E-08	4.1E-09	4.0E-09
Th-228	1.1E-01	4.4E-02	1.4E-03	3.2E-03	7.3E-04	7.2E-04
Th-229	5.1E-09	2.0E-09	6.4E-11	1.5E-10	3.4E-11	3.3E-11
Th-230	8.8E-06	3.5E-06	1.1E-07	2.6E-07	5.9E-08	5.8E-08
Th-232	1.7E-11	6.6E-12	2.1E-13	4.8E-13	1.1E-13	1.1E-13
Pa-231	1.6E-06	6.4E-07	2.0E-08	4.7E-08	1.1E-08	1.1E-08
U-232	2.2E-04	8.9E-05	2.8E-06	6.5E-06	1.5E-06	1.5E-06
U-233	3.2E-07	1.3E-07	4.0E-09	9.2E-09	2.1E-09	2.1E-09
U-234	2.2E-02	9.0E-03	2.8E-04	6.5E-04	1.5E-04	1.5E-04
U-235	1.5E-04	5.9E-05	1.9E-06	4.3E-06	9.7E-07	9.6E-07
U-236	3.7E-04	1.5E-04	4.6E-06	1.1E-05	2.4E-06	2.4E-06
U-238	7.6E-06	3.0E-06	9.6E-08	2.2E-07	5.0E-08	5.0E-08
Np-237	2.2E-03	8.8E-04	2.8E-05	6.4E-05	1.5E-05	1.4E-05
Pu-238	2.7E+01	1.1E+01	3.4E-01	7.8E-01	1.8E-01	1.8E-01
Pu-239	4.4E-01	1.8E-01	5.6E-03	1.3E-02	2.9E-03	2.9E-03
Pu-240	3.4E-01	1.4E-01	4.3E-03	9.9E-03	2.3E-03	2.2E-03
Pu-241	3.9E+01	1.6E+01	4.9E-01	1.1E+00	2.6E-01	2.6E-01
Pu-242	7.1E-04	2.8E-04	9.0E-06	2.1E-05	4.7E-06	4.6E-06
Pu-244	1.1E-11	4.3E-12	1.4E-13	3.1E-13	7.1E-14	7.0E-14
Am-241	1.9E+00	7.6E-01	2.4E-02	5.5E-02	1.3E-02	1.2E-02
Am-243	1.8E-02	7.2E-03	2.3E-04	5.2E-04	1.2E-04	1.2E-04
Cm-243	5.7E-04	2.3E-04	7.2E-06	1.6E-05	3.8E-06	3.7E-06
Cm-244	3.5E-02	1.4E-02	4.4E-04	1.0E-03	2.3E-04	2.3E-04
Cm-245	3.2E-06	1.3E-06	4.0E-08	9.2E-08	2.1E-08	2.1E-08
Cm-246	2.5E-07	1.0E-07	3.2E-09	7.3E-09	1.7E-09	1.6E-09
Cm-247	3.2E-13	1.3E-13	4.1E-15	9.4E-15	2.1E-15	2.1E-15
Cm-248	3.9E-13	1.6E-13	5.0E-15	1.1E-14	2.6E-15	2.6E-15

Table F-19. Lower-bound activities associated with soil disposals sent to RWMC from 1974 through 1983. (These inventories are included in the INTEC-MOD-7H waste stream).

Nuclide	1974 Ci	1975 Ci	1976 Ci	1977 Ci	1978 Ci	1983 Ci
H- 3	2.3E+00	9.3E-01	2.9E-02	6.7E-02	1.5E-02	1.5E-02
Be-10	3.1E-08	1.2E-08	3.9E-10	9.0E-10	2.1E-10	2.0E-10
C-14	1.3E-06	5.2E-07	1.7E-08	3.8E-08	8.7E-09	8.6E-09
Cl-36						
Co-60	1.0E+00	4.1E-01	1.3E-02	3.0E-02	6.7E-03	6.7E-03
Ni-59	2.7E-03	1.1E-03	3.5E-05	7.9E-05	1.8E-05	1.8E-05
Ni-63	1.8E-01	7.4E-02	2.3E-03	5.4E-03	1.2E-03	1.2E-03
Sr-90	8.3E+02	3.3E+02	1.0E+01	2.4E+01	5.5E+00	5.4E+00
Nb-94	2.5E-07	1.0E-07	3.2E-09	7.3E-09	1.7E-09	1.7E-09
Tc-99	1.6E-01	6.5E-02	2.0E-03	4.7E-03	1.1E-03	1.1E-03
I-129	2.6E-04	1.0E-04	3.3E-06	7.6E-06	1.7E-06	1.7E-06
Cs-137	8.1E+02	3.3E+02	1.0E+01	2.4E+01	5.4E+00	5.3E+00
Eu-152	5.8E-02	2.3E-02	7.3E-04	1.7E-03	3.8E-04	3.8E-04
Eu-154	1.1E+01	4.2E+00	1.3E-01	3.1E-01	7.0E-02	6.9E-02
Pb-210	2.1E-09	8.5E-10	2.7E-11	6.2E-11	1.4E-11	1.4E-11
Ra-226	3.0E-07	1.2E-07	3.8E-09	8.7E-09	2.0E-09	2.0E-09
Ra-228	4.5E-11	1.8E-11	5.7E-13	1.3E-12	3.0E-13	3.0E-13
Ac-227	7.8E-08	3.1E-08	9.9E-10	2.3E-09	5.2E-10	5.1E-10
Th-228	1.4E-02	5.6E-03	1.8E-04	4.1E-04	9.3E-05	9.2E-05
Th-229	6.4E-10	2.6E-10	8.2E-12	1.9E-11	4.3E-12	4.2E-12
Th-230	1.1E-06	4.5E-07	1.4E-08	3.3E-08	7.4E-09	7.4E-09
Th-232	2.1E-12	8.4E-13	2.7E-14	6.1E-14	1.4E-14	1.4E-14
Pa-231	2.0E-07	8.2E-08	2.6E-09	6.0E-09	1.4E-09	1.3E-09
U-232	2.8E-05	1.1E-05	3.6E-07	8.2E-07	1.9E-07	1.9E-07
U-233	4.0E-08	1.6E-08	5.1E-10	1.2E-09	2.7E-10	2.6E-10
U-234	2.9E-03	1.1E-03	3.6E-05	8.3E-05	1.9E-05	1.9E-05
U-235	1.9E-05	7.4E-06	2.4E-07	5.4E-07	1.2E-07	1.2E-07
U-236	4.6E-05	1.9E-05	5.9E-07	1.4E-06	3.1E-07	3.1E-07
U-238	9.6E-07	3.8E-07	1.2E-08	2.8E-08	6.4E-09	6.3E-09
Np-237	2.8E-04	1.1E-04	3.5E-06	8.1E-06	1.9E-06	1.8E-06
Pu-238	3.4E+00	1.4E+00	4.3E-02	9.9E-02	2.3E-02	2.2E-02
Pu-239	5.6E-02	2.2E-02	7.1E-04	1.6E-03	3.7E-04	3.7E-04
Pu-240	4.3E-02	1.7E-02	5.5E-04	1.3E-03	2.9E-04	2.9E-04
Pu-241	4.9E+00	2.0E+00	6.3E-02	1.4E-01	3.3E-02	3.2E-02
Pu-242	9.0E-05	3.6E-05	1.1E-06	2.6E-06	6.0E-07	5.9E-07
Pu-244	1.4E-12	5.5E-13	1.7E-14	4.0E-14	9.1E-15	9.0E-15
Am-241	2.4E-01	9.6E-02	3.1E-03	7.0E-03	1.6E-03	1.6E-03
Am-243	2.3E-03	9.1E-04	2.9E-05	6.6E-05	1.5E-05	1.5E-05
Cm-243	7.2E-05	2.9E-05	9.2E-07	2.1E-06	4.8E-07	4.7E-07
Cm-244	4.4E-03	1.8E-03	5.6E-05	1.3E-04	2.9E-05	2.9E-05
Cm-245	4.0E-07	1.6E-07	5.1E-09	1.2E-08	2.7E-09	2.6E-09
Cm-246	3.2E-08	1.3E-08	4.0E-10	9.3E-10	2.1E-10	2.1E-10
Cm-247	4.1E-14	1.6E-14	5.2E-16	1.2E-15	2.7E-16	2.7E-16
Cm-248	5.0E-14	2.0E-14	6.3E-16	1.5E-15	3.3E-16	3.3E-16

F-9. ESTIMATED ACTIVATION PRODUCT INVENTORY FOR THE IRRADIATED SUBASSEMBLY HARDWARE (1952 THROUGH 1983)

Nearly all of the activation product waste generated at INTEC from fuel reprocessing activities and later sent to the SDA for disposal was produced from neutron-activated stainless steel hardware (alloys 304 and 316) associated with EBR-II subassemblies. This waste stream spans 1952 through 1983. A review of the disposal records determined that after 1983 no significant burials of activated metal from INTEC were made in the SDA.

Irradiated subassembly hardware sent to the SDA from 1977 through 1983 represents the bulk of the buried activation products identified during the time addressed in the HDT (i.e., 1952 through 1983). Records from the RWMIS database document hundreds of waste shipments, most of which contain only trace activation-product contaminants; however, the activated products in this waste are less than 1% of the contaminants in the shipments of subassembly hardware from EBR-II. As in later shipments made during the time addressed in the Recent and Projected Data Task (RPDT) (i.e., 1984 through 2003), the material composition of the subassembly components was primarily 304 and 316 stainless steels.

Radionuclides with relatively short half-lives (e.g., less than Co-60) are not included in the present analysis. For example, the principal radionuclides in activated steel fall into two main groups. Those radionuclides with short half-lives (i.e., less than a year), especially those with a relatively low radiotoxicity, belong to one group; and those radionuclides with a relatively long half-life (e.g., greater than 5 years) and a high radiotoxicity belong to the second group. For example, Cr-51 (28 days), Co-58 (71 days), Fe-59 (44 days), and Mn-54 (312 days) are activation products with short half-lives and moderate to low radiotoxicities. These radionuclides were mainly considered in the HDT and RPDT analyses but were not considered in the present analysis. However, the long-lived activation products are more important to defining the long-term inventory and radiological risk to the SDA. These radionuclides are C-14 (5,730 years), Cl-36 (301,000 years), Co-60 (5.27 years), Ni-59 (76,000 years), Ni-63 (100 years), Nb-94 (20,000 years), and Tc-99 (213,000 years). It is the purpose of the present best-estimate analysis to determine the inventory of the long-lived radionuclides, and neglect the inventory associated with the short-lived isotopes.

The INTEC reprocessing dates for the four major electrolytic dissolution campaigns are not necessarily the same as the disposal dates given for activated metal listed in the RWMIS database (e.g., hardware processed in one year may have been retained at INTEC for a period of time and then disposed of in a different year). Consequently, some of the calculated inventory data has been redistributed into estimated disposal dates, as follows:

- All of the hardware associated with the first electrolytic dissolution campaign, which occurred in 1973, is assumed to have been disposed of at the SDA in 1973. This assumption is slightly conservative since some stainless steel hardware was dissolved at INTEC (e.g., included in calcine wastes) and was not sent to the SDA.
- All of the hardware that was processed at INTEC from 1975 through 1976, which includes the second electrolytic dissolution campaign, is assumed to have been disposed of at the SDA in 1975 and 1977 (50% in each year).
- All of the structural hardware that was processed at INTEC in 1977 is modeled as if it were disposed of at the SDA in waste shipments made in 1981 and 1982 (50% in each year).
- All of the EBR-II fuel that was reprocessed at INTEC from 1981 to 1982 was completely dissolved (e.g., this fuel contained metallic uranium and stainless steel cladding, but no structural components).

Therefore, no activated metal waste from the fourth electrolytic dissolution campaign is believed to have been disposed of at the SDA.

Table F-20. Best-estimate activities associated with EBR-II subassembly disposals sent to RWMC from 1952 through 1983. (These inventories are included in the INTEC-MOD-8H waste stream).

Isotope	Half-life (years)	Estimated shipping dates to the SDA from INTEC:					Total (Ci)
		1973 (Ci)	1975 (Ci)	1977 (Ci)	1981 (Ci)	1982 (Ci)	
H-3	1.23E+01	—	—	—	—	—	—
Be-10	1.60E+06	—	—	—	—	—	—
C-14	5.73E+03	4.74E-01	6.80E-01	6.80E-01	3.63E-01	3.63E-01	2.56E+00
Cl-36	3.01E+05	2.56E-04	3.83E-04	3.83E-04	1.91E-04	1.91E-04	1.40E-03
Co-60	5.27E+00	3.06E+04	4.38E+04	4.38E+04	2.35E+04	2.35E+04	1.65E+05
Ni-59	7.60E+04	2.08E+00	2.99E+00	2.99E+00	1.60E+00	1.60E+00	1.13E+01
Ni-63	1.00E+02	1.55E+02	2.22E+02	2.22E+02	1.19E+02	1.19E+02	8.37E+02
Nb-94	2.00E+04	1.08E-01	1.55E-01	1.55E-01	8.30E-02	8.30E-02	5.84E-01
Tc-99	2.13E+05	5.30E-02	7.50E-02	7.50E-02	4.05E-02	4.05E-02	2.84E-01
Total (Ci)		3.08E+04	4.40E+04	4.40E+04	2.36E+04	2.36E+04	1.66E+05

Table F-21. Upper-bound activities associated with EBR-II subassembly disposals sent to RWMC from 1952 through 1983. (These inventories are included in the INTEC-MOD-8H waste stream).

Isotope	Estimated shipping dates to the SDA from INTEC:					Total (Ci)
	1973 (Ci)	1975 (Ci)	1977 (Ci)	1981 (Ci)	1982 (Ci)	
H-3	—	—	—	—	—	—
Be-10	—	—	—	—	—	—
C-14	9.48E-01	1.36E+00	1.36E+00	7.26E-01	7.26E-01	5.12E+00
Cl-36	5.12E-04	7.66E-04	7.66E-04	3.82E-04	3.82E-04	2.81E-03
Co-60	6.12E+04	8.76E+04	8.76E+04	4.70E+04	4.70E+04	3.30E+05
Ni-59	4.16E+00	5.98E+00	5.98E+00	3.20E+00	3.20E+00	2.25E+01
Ni-63	3.10E+02	4.44E+02	4.44E+02	2.38E+02	2.38E+02	1.67E+03
Nb-94	2.16E-01	3.10E-01	3.10E-01	1.66E-01	1.66E-01	1.17E+00
Tc-99	1.06E-01	1.50E-01	1.50E-01	8.10E-02	8.10E-02	5.68E-01
Total (Ci)	6.15E+04	8.81E+04	8.81E+04	4.72E+04	4.72E+04	3.32E+05

Table F-22. Lower-bound activities associated with EBR-II subassembly disposals sent to RWMC from 1952 through 1983. (These inventories are included in the INTEC-MOD-8H waste stream).

Isotope	Estimated shipping dates to the SDA from INTEC:					
	1973 (Ci)	1975 (Ci)	1977 (Ci)	1981 (Ci)	1982 (Ci)	Total (Ci)
H-3	—	—	—	—	—	—
Be-10	—	—	—	—	—	—
C-14	2.37E-01	3.40E-01	3.40E-01	1.82E-01	1.82E-01	1.28E+00
Cl-36	1.28E-04	1.92E-04	1.92E-04	9.55E-05	9.55E-05	7.02E-04
Co-60	1.53E+04	2.19E+04	2.19E+04	1.18E+04	1.18E+04	8.26E+04
Ni-59	1.04E+00	1.50E+00	1.50E+00	8.00E-01	8.00E-01	5.63E+00
Ni-63	7.75E+01	1.11E+02	1.11E+02	5.95E+01	5.95E+01	4.19E+02
Nb-94	5.40E-02	7.75E-02	7.75E-02	4.15E-02	4.15E-02	2.92E-01
Tc-99	2.65E-02	3.75E-02	3.75E-02	2.03E-02	2.03E-02	1.42E-01
Total (Ci)	1.54E+04	2.20E+04	2.20E+04	1.18E+04	1.18E+04	8.30E+04

F-10. GENERAL PLANT WASTE

This waste stream is general plant waste and is identified as INTEC-MOD-9H. In brief, general plant waste consists of all radioactive items that have not been incorporated in any of the other previously identified waste streams. These wastes are generally both compactable and non-compactable materials. Compactable material includes items such as cloth, paper, and plastic. Noncompactable materials consist of miscellaneous wastes (e.g., radioactive sources), contaminated concrete, metal, building materials, fuel charging casks, lead, and those items that were contaminated with other radioactive materials (e.g., calcine material). Both fission products and actinides can be found in general plant waste; however, both types of radionuclides are usually found at lower concentrations than generally found in other waste streams.

The gross activity for the general plant waste stream was determined from waste shipment records or the RWMIS or WasteOScope databases. The total activities associated with general plant waste were calculated as the total reported activity minus other waste streams that have already been identified and taken into account. From 1959 through 1970, the estimated Cs-137 activity is equal to the total general plant waste activity. However, from 1971 through 1983, the Cs-137 activity is estimated to be 25% of the total gross activity. The reason for these different assumptions is based on the following observations: (1) the total reported activities during the early years appears to be based on measured gross-gamma activities, and the data would have been primarily associated with the activity from Cs-137; (2) the reported activities from 1971 through 1983 appear to be associated with radioactive materials whose total activity (including both gamma and beta activities) was estimated (not measured). Therefore, the Cs-137 inventory in MFP waste is only a fraction of the total reported activity. Over a long period of time, the Cs-137 activity in radioactive fuel (or calcine material) averages about 25% of the total activity. Therefore, the Cs-137 activity in general plant waste from 1971 through 1983 was estimated to be 25% of the total reported activity.

Once the Cs-137 inventory in the general plant waste stream has been estimated, the activity of other radionuclides can be determined by multiplying the estimated Cs-137 activity by the corresponding best-estimate scaling factors.

Table F-23. Best-estimate activities associated with general plant waste disposals sent to RWMC from 1959 through 1983. (These inventories are included in the INTEC-MOD-9H waste stream).

<u>Best-estimate inventory for waste stream INTEC-MOD-9H (1959-1970)</u>												
Nuclide	1959 (Ci)	1960 (Ci)	1961 (Ci)	1962 (Ci)	1963 (Ci)	1964 (Ci)	1965 (Ci)	1966 (Ci)	1967 (Ci)	1968 (Ci)	1969 (Ci)	1970 (Ci)
H3	4.04E-01	1.22E-01	2.99E-01	2.25E-01	3.27E-01	3.34E-01	2.42E-01	3.32E-01	4.82E-01	1.48E-01	8.15E-01	1.44E-01
C14	5.41E-09	1.64E-09	4.00E-09	3.01E-09	4.37E-09	4.47E-09	3.23E-09	4.45E-09	6.45E-09	1.98E-09	1.09E-08	1.92E-09
Cl36	2.28E-07	6.89E-08	1.68E-07	1.26E-07	1.84E-07	1.88E-07	1.36E-07	1.87E-07	2.71E-07	8.33E-08	4.59E-07	8.10E-08
Co60												
Ni59	1.77E-01	5.37E-02	1.31E-01	9.85E-02	1.43E-01	1.46E-01	1.06E-01	1.46E-01	2.12E-01	6.49E-02	3.57E-01	6.31E-02
Ni63	4.75E-04	1.44E-04	3.51E-04	2.64E-04	3.84E-04	3.92E-04	2.84E-04	3.90E-04	5.66E-04	1.74E-04	9.57E-04	1.69E-04
SR90	3.22E-02	9.75E-03	2.38E-02	1.79E-02	2.60E-02	2.66E-02	1.92E-02	2.65E-02	3.84E-02	1.18E-02	6.49E-02	1.14E-02
NB94	1.44E+02	4.36E+01	1.07E+02	8.00E+01	1.16E+02	1.19E+02	8.61E+01	1.18E+02	1.72E+02	5.27E+01	2.90E+02	5.12E+01
TC99	4.39E-08	1.33E-08	3.24E-08	2.44E-08	3.54E-08	3.62E-08	2.62E-08	3.61E-08	5.23E-08	1.60E-08	8.84E-08	1.56E-08
I129	2.82E-02	8.52E-03	2.08E-02	1.56E-02	2.27E-02	2.32E-02	1.68E-02	2.31E-02	3.36E-02	1.03E-02	5.67E-02	1.00E-02
CS137	4.55E-05	1.38E-05	3.36E-05	2.52E-05	3.67E-05	3.75E-05	2.72E-05	3.74E-05	5.42E-05	1.66E-05	9.16E-05	1.62E-05
EU152	1.42E+02	4.30E+01	1.05E+02	7.89E+01	1.15E+02	1.17E+02	8.48E+01	1.17E+02	1.69E+02	5.19E+01	2.86E+02	5.05E+01
EU154	1.01E-02	3.05E-03	7.46E-03	5.60E-03	8.15E-03	8.33E-03	6.03E-03	8.29E-03	1.20E-02	3.69E-03	2.03E-02	3.59E-03
PB210	1.84E+00	5.58E-01	1.36E+00	1.02E+00	1.49E+00	1.52E+00	1.10E+00	1.51E+00	2.20E+00	6.73E-01	3.71E+00	6.55E-01
RA226	3.70E-10	1.12E-10	2.74E-10	2.05E-10	2.99E-10	3.05E-10	2.21E-10	3.04E-10	4.41E-10	1.35E-10	7.45E-10	1.31E-10
RA228	5.23E-08	1.58E-08	3.87E-08	2.90E-08	4.22E-08	4.32E-08	3.12E-08	4.30E-08	6.23E-08	1.91E-08	1.05E-07	1.86E-08
AC227	7.90E-12	2.39E-12	5.85E-12	4.39E-12	6.38E-12	6.52E-12	4.72E-12	6.50E-12	9.42E-12	2.89E-12	1.59E-11	2.81E-12
TH228	1.36E-08	4.11E-09	1.00E-08	7.54E-09	1.10E-08	1.12E-08	8.11E-09	1.12E-08	1.62E-08	4.96E-09	2.73E-08	4.83E-09
TH229	2.44E-03	7.37E-04	1.80E-03	1.35E-03	1.97E-03	2.01E-03	1.46E-03	2.00E-03	2.90E-03	8.91E-04	4.91E-03	8.66E-04
TH230	1.12E-10	3.40E-11	8.30E-11	6.23E-11	9.07E-11	9.27E-11	6.71E-11	9.23E-11	1.34E-10	4.10E-11	2.26E-10	3.99E-11
TH232	1.96E-07	5.93E-08	1.45E-07	1.09E-07	1.58E-07	1.62E-07	1.17E-07	1.61E-07	2.33E-07	7.16E-08	3.95E-07	6.96E-08
PA231	3.68E-13	1.11E-13	2.72E-13	2.04E-13	2.97E-13	3.04E-13	2.20E-13	3.03E-13	4.39E-13	1.35E-13	7.42E-13	1.31E-13

Table continued next page

Table F-23. (Part 2). Best-estimate activities associated with general plant waste disposals sent to RWMC from 1952 through 1983.

Best-estimate inventory for waste stream INTEC-MOD-9H (1959-1970)												
Nuclide	1959 (Ci)	1960 (Ci)	1961 (Ci)	1962 (Ci)	1963 (Ci)	1964 (Ci)	1965 (Ci)	1966 (Ci)	1967 (Ci)	1968 (Ci)	1969 (Ci)	1970 (Ci)
U232	4.92E-06	1.49E-06	3.64E-06	2.73E-06	3.98E-06	4.06E-06	2.94E-06	4.05E-06	5.87E-06	1.80E-06	9.92E-06	1.75E-06
U233	7.04E-09	2.13E-09	5.21E-09	3.91E-09	5.68E-09	5.81E-09	4.20E-09	5.79E-09	8.39E-09	2.57E-09	1.42E-08	2.50E-09
U234	4.98E-04	1.51E-04	3.68E-04	2.77E-04	4.02E-04	4.11E-04	2.97E-04	4.09E-04	5.94E-04	1.82E-04	1.00E-03	1.77E-04
U235	3.25E-06	9.83E-07	2.40E-06	1.80E-06	2.62E-06	2.68E-06	1.94E-06	2.67E-06	3.87E-06	1.19E-06	6.54E-06	1.15E-06
U236	8.12E-06	2.46E-06	6.01E-06	4.51E-06	6.56E-06	6.70E-06	4.85E-06	6.68E-06	9.68E-06	2.97E-06	1.64E-05	2.89E-06
U238	1.68E-07	5.08E-08	1.24E-07	9.32E-08	1.36E-07	1.39E-07	1.00E-07	1.38E-07	2.00E-07	6.14E-08	3.38E-07	5.97E-08
NP237	4.87E-05	1.47E-05	3.60E-05	2.71E-05	3.94E-05	4.02E-05	2.91E-05	4.01E-05	5.81E-05	1.78E-05	9.82E-05	1.73E-05
PU238	5.93E-01	1.79E-01	4.38E-01	3.29E-01	4.79E-01	4.89E-01	3.54E-01	4.87E-01	7.06E-01	2.17E-01	1.19E+00	2.11E-01
PU239	9.75E-03	2.95E-03	7.21E-03	5.41E-03	7.87E-03	8.05E-03	5.82E-03	8.01E-03	1.16E-02	3.56E-03	1.96E-02	3.47E-03
PU240	7.59E-03	2.30E-03	5.61E-03	4.21E-03	6.13E-03	6.27E-03	4.53E-03	6.24E-03	9.05E-03	2.77E-03	1.53E-02	2.70E-03
PU241	8.62E-01	2.61E-01	6.38E-01	4.79E-01	6.96E-01	7.12E-01	5.15E-01	7.09E-01	1.03E+00	3.15E-01	1.74E+00	3.07E-01
PU242	1.57E-05	4.75E-06	1.16E-05	8.72E-06	1.27E-05	1.30E-05	9.38E-06	1.29E-05	1.87E-05	5.74E-06	3.16E-05	5.58E-06
Pu244	2.38E-13	7.21E-14	1.76E-13	1.32E-13	1.92E-13	1.97E-13	1.42E-13	1.96E-13	2.84E-13	8.71E-14	4.80E-13	8.47E-14
AM241	4.21E-02	1.27E-02	3.11E-02	2.34E-02	3.40E-02	3.47E-02	2.51E-02	3.46E-02	5.02E-02	1.54E-02	8.48E-02	1.50E-02
AM243	3.98E-04	1.20E-04	2.94E-04	2.21E-04	3.21E-04	3.28E-04	2.37E-04	3.27E-04	4.74E-04	1.45E-04	8.01E-04	1.41E-04
Cm243	1.26E-05	3.81E-06	9.31E-06	6.99E-06	1.02E-05	1.04E-05	7.52E-06	1.03E-05	1.50E-05	4.60E-06	2.54E-05	4.47E-06
CM244	7.74E-04	2.34E-04	5.72E-04	4.30E-04	6.25E-04	6.39E-04	4.62E-04	6.36E-04	9.22E-04	2.83E-04	1.56E-03	2.75E-04
CM245	7.00E-08	2.12E-08	5.17E-08	3.88E-08	5.65E-08	5.78E-08	4.18E-08	5.75E-08	8.34E-08	2.56E-08	1.41E-07	2.49E-08
CM246	5.56E-09	1.68E-09	4.11E-09	3.08E-09	4.49E-09	4.59E-09	3.32E-09	4.57E-09	6.62E-09	2.03E-09	1.12E-08	1.97E-09
CM247	7.18E-15	2.17E-15	5.31E-15	3.98E-15	5.80E-15	5.92E-15	4.29E-15	5.90E-15	8.55E-15	2.62E-15	1.45E-14	2.55E-15
CM248	8.71E-15	2.64E-15	6.44E-15	4.84E-15	7.04E-15	7.19E-15	5.20E-15	7.16E-15	1.04E-14	3.19E-15	1.76E-14	3.10E-15

Table F-23. (Part 3). Best-estimate activities associated with general plant waste disposals sent to RWMC from 1959 through 1983.

	<u>Best-estimate inventory for waste stream INTEC-MOD-9H (1971-1983)</u>												
Nuclide	1971 (Ci)	1972 (Ci)	1973 (Ci)	1974 (Ci)	1975 (Ci)	1976 (Ci)	1977 (Ci)	1978 (Ci)	1979 (Ci)	1980 (Ci)	1981 (Ci)	1982 (Ci)	1983 (Ci)
H3	2.46E-02	5.22E-02	1.81E-02	9.00E-02	7.19E-03	3.47E-02	2.67E-01	6.34E-01	2.25E-01	1.07E-01	1.33E-01	5.97E-02	1.08E-01
C14	3.3E-10	7.0E-10	2.4E-10	1.2E-09	9.6E-11	4.7E-10	3.6E-09	8.5E-09	3.0E-09	1.4E-09	1.8E-09	8.0E-10	1.4E-09
Cl36	1.4E-08	2.9E-08	1.0E-08	5.1E-08	4.1E-09	2.0E-08	1.5E-07	3.6E-07	1.3E-07	6.0E-08	7.5E-08	3.4E-08	6.1E-08
Co60													
Ni59	1.1E-02	2.3E-02	7.9E-03	3.9E-02	3.2E-03	1.5E-02	1.2E-01	2.8E-01	9.9E-02	4.7E-02	5.9E-02	2.6E-02	4.7E-02
Ni63	2.9E-05	6.1E-05	2.1E-05	1.1E-04	8.4E-06	4.1E-05	3.1E-04	7.4E-04	2.6E-04	1.3E-04	1.6E-04	7.0E-05	1.3E-04
SR90	2.0E-03	4.2E-03	1.4E-03	7.2E-03	5.7E-04	2.8E-03	2.1E-02	5.0E-02	1.8E-02	8.5E-03	1.1E-02	4.8E-03	8.6E-03
NB94	8.8E+00	1.9E+01	6.4E+00	3.2E+01	2.6E+00	1.2E+01	9.5E+01	2.3E+02	8.0E+01	3.8E+01	4.8E+01	2.1E+01	3.8E+01
TC99	2.7E-09	5.7E-09	2.0E-09	9.8E-09	7.8E-10	3.8E-09	2.9E-08	6.9E-08	2.4E-08	1.2E-08	1.4E-08	6.5E-09	1.2E-08
I129	1.7E-03	3.6E-03	1.3E-03	6.3E-03	5.0E-04	2.4E-03	1.9E-02	4.4E-02	1.6E-02	7.4E-03	9.3E-03	4.2E-03	7.5E-03
CS137	2.8E-06	5.9E-06	2.0E-06	1.0E-05	8.1E-07	3.9E-06	3.0E-05	7.1E-05	2.5E-05	1.2E-05	1.5E-05	6.7E-06	1.2E-05
EU152	8.6E+00	1.8E+01	6.4E+00	3.2E+01	2.5E+00	1.2E+01	9.4E+01	2.2E+02	7.9E+01	3.7E+01	4.7E+01	2.1E+01	3.8E+01
EU154	6.1E-04	1.3E-03	4.5E-04	2.2E-03	1.8E-04	8.7E-04	6.7E-03	1.6E-02	5.6E-03	2.7E-03	3.3E-03	1.5E-03	2.7E-03
PB210	1.1E-01	2.4E-01	8.2E-02	4.1E-01	3.3E-02	1.6E-01	1.2E+00	2.9E+00	1.0E+00	4.9E-01	6.1E-01	2.7E-01	4.9E-01
RA226	2.3E-11	4.8E-11	1.7E-11	8.2E-11	6.6E-12	3.2E-11	2.4E-10	5.8E-10	2.1E-10	9.7E-11	1.2E-10	5.5E-11	9.9E-11
RA228	3.2E-09	6.7E-09	2.3E-09	1.2E-08	9.3E-10	4.5E-09	3.5E-08	8.2E-08	1.0E-01	1.4E-08	1.7E-08	7.7E-09	1.4E-08
AC227	4.8E-13	1.0E-12	3.5E-13	1.8E-12	1.4E-13	6.8E-13	5.2E-12	1.2E-11	4.4E-12	2.1E-12	2.6E-12	1.2E-12	2.1E-12
TH228	8.3E-10	1.8E-09	6.1E-10	3.0E-09	2.4E-10	1.2E-09	9.0E-09	2.1E-08	7.6E-09	3.6E-09	4.5E-09	2.0E-09	3.6E-09
TH229	1.5E-04	3.1E-04	1.1E-04	5.4E-04	4.3E-05	2.1E-04	1.6E-03	3.8E-03	1.4E-03	6.4E-04	8.0E-04	3.6E-04	6.5E-04
TH230	6.8E-12	1.4E-11	5.0E-12	2.5E-11	2.0E-12	9.6E-12	7.4E-11	1.8E-10	6.3E-11	3.0E-11	3.7E-11	1.7E-11	3.0E-11
TH232	1.2E-08	2.5E-08	8.8E-09	4.4E-08	3.5E-09	1.7E-08	1.3E-07	3.1E-07	1.1E-07	5.2E-08	6.5E-08	2.9E-08	5.2E-08
PA231	2.2E-14	4.8E-14	1.6E-14	8.2E-14	6.5E-15	3.2E-14	2.4E-13	5.8E-13	2.1E-13	9.7E-14	1.2E-13	5.4E-14	9.8E-14

Table continued next page

Table F-23. (Part 4). Best-estimate activities associated with general plant waste disposals sent to RWMC from 1959 through 1983.

	Best-estimate inventory for waste stream INTEC-MOD-9H (1971-1983)												
Nuclide	1971 (Ci)	1972 (Ci)	1973 (Ci)	1974 (Ci)	1975 (Ci)	1976 (Ci)	1977 (Ci)	1978 (Ci)	1979 (Ci)	1980 (Ci)	1981 (Ci)	1982 (Ci)	1983 (Ci)
U232	3.0E-07	6.4E-07	2.2E-07	1.1E-06	8.8E-08	4.2E-07	3.3E-06	7.7E-06	2.7E-06	1.3E-06	1.6E-06	7.3E-07	1.3E-06
U233	4.3E-10	9.1E-10	3.1E-10	1.6E-09	1.3E-10	6.0E-10	4.7E-09	1.1E-08	3.9E-09	1.9E-09	2.3E-09	1.0E-09	1.9E-09
U234	3.0E-05	6.4E-05	2.2E-05	1.1E-04	8.9E-06	4.3E-05	3.3E-04	7.8E-04	2.8E-04	1.3E-04	1.6E-04	7.4E-05	1.3E-04
U235	2.0E-07	4.2E-07	1.5E-07	7.2E-07	5.8E-08	2.8E-07	2.1E-06	5.1E-06	1.8E-06	8.6E-07	1.1E-06	4.8E-07	8.7E-07
U236	4.9E-07	1.0E-06	3.6E-07	1.8E-06	1.4E-07	7.0E-07	5.4E-06	1.3E-05	4.5E-06	2.1E-06	2.7E-06	1.2E-06	2.2E-06
U238	1.0E-08	2.2E-08	7.5E-09	3.7E-08	3.0E-09	1.4E-08	1.1E-07	2.6E-07	9.4E-08	4.4E-08	5.5E-08	2.5E-08	4.5E-08
NP237	3.0E-06	6.3E-06	2.2E-06	1.1E-05	8.7E-07	4.2E-06	3.2E-05	7.6E-05	2.7E-05	1.3E-05	1.6E-05	7.2E-06	1.3E-05
PU238	3.6E-02	7.6E-02	2.7E-02	1.3E-01	1.1E-02	5.1E-02	3.9E-01	9.3E-01	3.3E-01	1.6E-01	2.0E-01	8.8E-02	1.6E-01
PU239	5.9E-04	1.3E-03	4.4E-04	2.2E-03	1.7E-04	8.4E-04	6.4E-03	1.5E-02	5.4E-03	2.6E-03	3.2E-03	1.4E-03	2.6E-03
PU240	4.6E-04	9.8E-04	3.4E-04	1.7E-03	1.3E-04	6.5E-04	5.0E-03	1.2E-02	4.2E-03	2.0E-03	2.5E-03	1.1E-03	2.0E-03
PU241	5.3E-02	1.1E-01	3.9E-02	1.9E-01	1.5E-02	7.4E-02	5.7E-01	1.4E+00	4.8E-01	2.3E-01	2.8E-01	1.3E-01	2.3E-01
PU242	9.6E-07	2.0E-06	7.0E-07	3.5E-06	2.8E-07	1.3E-06	1.0E-05	2.5E-05	8.8E-06	4.1E-06	5.2E-06	2.3E-06	4.2E-06
Pu244	1.5E-14	3.1E-14	1.1E-14	5.3E-14	4.2E-15	2.0E-14	1.6E-13	3.7E-13	1.3E-13	6.3E-14	7.9E-14	3.5E-14	6.3E-14
AM241	2.6E-03	5.4E-03	1.9E-03	9.4E-03	7.5E-04	3.6E-03	2.8E-02	6.6E-02	2.3E-02	1.1E-02	1.4E-02	6.2E-03	1.1E-02
AM243	2.4E-05	5.1E-05	1.8E-05	8.8E-05	7.1E-06	3.4E-05	2.6E-04	6.2E-04	2.2E-04	1.0E-04	1.3E-04	5.9E-05	1.1E-04
Cm243	7.7E-07	1.6E-06	5.6E-07	2.8E-06	2.2E-07	1.1E-06	8.3E-06	2.0E-05	7.0E-06	3.3E-06	4.2E-06	1.9E-06	3.4E-06
CM244	4.7E-05	1.0E-04	3.5E-05	1.7E-04	1.4E-05	6.6E-05	5.1E-04	1.2E-03	4.3E-04	2.0E-04	2.6E-04	1.1E-04	2.1E-04
CM245	4.3E-09	9.0E-09	3.1E-09	1.6E-08	1.2E-09	6.0E-09	4.6E-08	1.1E-07	3.9E-08	1.8E-08	2.3E-08	1.0E-08	1.9E-08
CM246	3.4E-10	7.2E-10	2.5E-10	1.2E-09	9.9E-11	4.8E-10	3.7E-09	8.7E-09	3.1E-09	1.5E-09	1.8E-09	8.2E-10	1.5E-09
CM247	4.4E-16	9.3E-16	3.2E-16	1.6E-15	1.3E-16	6.2E-16	4.7E-15	1.1E-14	4.0E-15	1.9E-15	2.4E-15	1.1E-15	1.9E-15
CM248	5.3E-16	1.1E-15	3.9E-16	1.9E-15	1.5E-16	7.5E-16	5.8E-15	1.4E-14	4.9E-15	2.3E-15	2.9E-15	1.3E-15	2.3E-15

Table F-24. Upper-bound activities associated with general plant waste disposals sent to RWMC from 1959 through 1983. (These inventories are included in the INTEC-MOD-9H waste stream).

Upper-bound inventory for waste stream INTEC-MOD-9H (1959-1970)												
Nuclide	1959 (Ci)	1960 (Ci)	1961 (Ci)	1962 (Ci)	1963 (Ci)	1964 (Ci)	1965 (Ci)	1966 (Ci)	1967 (Ci)	1968 (Ci)	1969 (Ci)	1970 (Ci)
H3	6.07E-01	1.84E-01	4.49E-01	3.37E-01	4.90E-01	5.01E-01	3.62E-01	4.99E-01	7.23E-01	2.22E-01	1.22E+00	2.16E-01
C14	8.12E-09	2.46E-09	6.01E-09	4.51E-09	6.56E-09	6.70E-09	4.85E-09	6.68E-09	9.68E-09	2.97E-09	1.64E-08	2.89E-09
Cl36	3.42E-07	1.03E-07	2.53E-07	1.90E-07	2.76E-07	2.82E-07	2.04E-07	2.81E-07	4.07E-07	1.25E-07	6.88E-07	1.21E-07
Co60	0.00E+00											
Ni59	2.66E-01	8.06E-02	1.97E-01	1.48E-01	2.15E-01	2.20E-01	1.59E-01	2.19E-01	3.17E-01	9.73E-02	5.36E-01	9.46E-02
Ni63	7.12E-04	2.16E-04	5.27E-04	3.96E-04	5.75E-04	5.88E-04	4.25E-04	5.86E-04	8.49E-04	2.60E-04	1.44E-03	2.53E-04
SR90	4.83E-02	1.46E-02	3.57E-02	2.68E-02	3.90E-02	3.99E-02	2.89E-02	3.97E-02	5.76E-02	1.77E-02	9.73E-02	1.72E-02
NB94	2.16E+02	6.54E+01	1.60E+02	1.20E+02	1.75E+02	1.78E+02	1.29E+02	1.78E+02	2.58E+02	7.90E+01	4.35E+02	7.68E+01
TC99	6.58E-08	1.99E-08	4.87E-08	3.65E-08	5.32E-08	5.43E-08	3.93E-08	5.41E-08	7.84E-08	2.41E-08	1.33E-07	2.34E-08
I129	4.22E-02	1.28E-02	3.12E-02	2.34E-02	3.41E-02	3.49E-02	2.52E-02	3.47E-02	5.03E-02	1.54E-02	8.51E-02	1.50E-02
CS137	6.82E-05	2.06E-05	5.04E-05	3.79E-05	5.51E-05	5.63E-05	4.07E-05	5.61E-05	8.13E-05	2.49E-05	1.37E-04	2.42E-05
EU152	2.13E+02	6.45E+01	1.58E+02	1.18E+02	1.72E+02	1.76E+02	1.27E+02	1.75E+02	2.54E+02	7.79E+01	4.29E+02	7.57E+01
EU154	1.51E-02	4.58E-03	1.12E-02	8.40E-03	1.22E-02	1.25E-02	9.04E-03	1.24E-02	1.80E-02	5.53E-03	3.05E-02	5.38E-03
PB210	2.76E+00	8.36E-01	2.04E+00	1.53E+00	2.23E+00	2.28E+00	1.65E+00	2.27E+00	3.29E+00	1.01E+00	5.57E+00	9.82E-01
RA226	5.55E-10	1.68E-10	4.10E-10	3.08E-10	4.48E-10	4.58E-10	3.31E-10	4.56E-10	6.61E-10	2.03E-10	1.12E-09	1.97E-10
RA228	7.84E-08	2.37E-08	5.80E-08	4.35E-08	6.33E-08	6.47E-08	4.68E-08	6.45E-08	9.35E-08	2.87E-08	1.58E-07	2.79E-08
AC227	1.19E-11	3.59E-12	8.77E-12	6.58E-12	9.57E-12	9.79E-12	7.08E-12	9.75E-12	1.41E-11	4.33E-12	2.39E-11	4.21E-12
TH228	2.04E-08	6.16E-09	1.51E-08	1.13E-08	1.64E-08	1.68E-08	1.22E-08	1.67E-08	2.43E-08	7.44E-09	4.10E-08	7.24E-09
TH229	3.65E-03	1.11E-03	2.70E-03	2.03E-03	2.95E-03	3.02E-03	2.18E-03	3.00E-03	4.36E-03	1.34E-03	7.36E-03	1.30E-03
TH230	1.68E-10	5.10E-11	1.25E-10	9.35E-11	1.36E-10	1.39E-10	1.01E-10	1.38E-10	2.01E-10	6.16E-11	3.39E-10	5.99E-11
TH232	2.94E-07	8.89E-08	2.17E-07	1.63E-07	2.37E-07	2.43E-07	1.75E-07	2.42E-07	3.50E-07	1.07E-07	5.92E-07	1.04E-07
PA231	5.52E-13	1.67E-13	4.08E-13	3.07E-13	4.46E-13	4.56E-13	3.30E-13	4.54E-13	6.58E-13	2.02E-13	1.11E-12	1.96E-13

Table continued next page

Table F-24. (Part 2). Upper-bound activities associated with general plant waste disposals sent to RWMC from 1952 through 1983.

Upper-bound inventory for waste stream INTEC-MOD-9H (1959-1970)												
Nuclide	1959 (Ci)	1960 (Ci)	1961 (Ci)	1962 (Ci)	1963 (Ci)	1964 (Ci)	1965 (Ci)	1966 (Ci)	1967 (Ci)	1968 (Ci)	1969 (Ci)	1970 (Ci)
U232	7.39E-06	2.24E-06	5.46E-06	4.10E-06	5.97E-06	6.10E-06	4.41E-06	6.07E-06	8.80E-06	2.70E-06	1.49E-05	2.63E-06
U233	1.06E-08	3.20E-09	7.81E-09	5.86E-09	8.53E-09	8.72E-09	6.31E-09	8.68E-09	1.26E-08	3.86E-09	2.13E-08	3.75E-09
U234	7.47E-04	2.26E-04	5.53E-04	4.15E-04	6.03E-04	6.17E-04	4.46E-04	6.14E-04	8.91E-04	2.73E-04	1.51E-03	2.66E-04
U235	4.87E-06	1.47E-06	3.60E-06	2.71E-06	3.94E-06	4.02E-06	2.91E-06	4.01E-06	5.81E-06	1.78E-06	9.82E-06	1.73E-06
U236	1.22E-05	3.69E-06	9.01E-06	6.76E-06	9.84E-06	1.01E-05	7.28E-06	1.00E-05	1.45E-05	4.45E-06	2.45E-05	4.33E-06
U238	2.52E-07	7.62E-08	1.86E-07	1.40E-07	2.03E-07	2.08E-07	1.50E-07	2.07E-07	3.00E-07	9.20E-08	5.07E-07	8.95E-08
NP237	7.31E-05	2.21E-05	5.41E-05	4.06E-05	5.90E-05	6.03E-05	4.37E-05	6.01E-05	8.71E-05	2.67E-05	1.47E-04	2.60E-05
PU238	8.89E-01	2.69E-01	6.57E-01	4.94E-01	7.18E-01	7.34E-01	5.31E-01	7.31E-01	1.06E+00	3.25E-01	1.79E+00	3.16E-01
PU239	1.46E-02	4.43E-03	1.08E-02	8.12E-03	1.18E-02	1.21E-02	8.73E-03	1.20E-02	1.74E-02	5.35E-03	2.95E-02	5.20E-03
PU240	1.14E-02	3.45E-03	8.42E-03	6.32E-03	9.20E-03	9.40E-03	6.80E-03	9.36E-03	1.36E-02	4.16E-03	2.29E-02	4.05E-03
PU241	1.29E+00	3.91E-01	9.57E-01	7.18E-01	1.04E+00	1.07E+00	7.73E-01	1.06E+00	1.54E+00	4.73E-01	2.61E+00	4.60E-01
PU242	2.36E-05	7.13E-06	1.74E-05	1.31E-05	1.90E-05	1.94E-05	1.41E-05	1.94E-05	2.81E-05	8.61E-06	4.74E-05	8.37E-06
Pu244	3.57E-13	1.08E-13	2.64E-13	1.98E-13	2.89E-13	2.95E-13	2.13E-13	2.94E-13	4.26E-13	1.31E-13	7.20E-13	1.27E-13
AM241	6.31E-02	1.91E-02	4.67E-02	3.50E-02	5.10E-02	5.21E-02	3.77E-02	5.19E-02	7.52E-02	2.31E-02	1.27E-01	2.24E-02
AM243	5.96E-04	1.81E-04	4.41E-04	3.31E-04	4.82E-04	4.92E-04	3.56E-04	4.90E-04	7.11E-04	2.18E-04	1.20E-03	2.12E-04
Cm243	1.89E-05	5.71E-06	1.40E-05	1.05E-05	1.53E-05	1.56E-05	1.13E-05	1.55E-05	2.25E-05	6.90E-06	3.80E-05	6.71E-06
CM244	1.16E-03	3.51E-04	8.59E-04	6.45E-04	9.38E-04	9.58E-04	6.93E-04	9.54E-04	1.38E-03	4.24E-04	2.34E-03	4.13E-04
CM245	1.05E-07	3.18E-08	7.76E-08	5.83E-08	8.48E-08	8.66E-08	6.27E-08	8.63E-08	1.25E-07	3.84E-08	2.11E-07	3.73E-08
CM246	8.33E-09	2.52E-09	6.16E-09	4.63E-09	6.73E-09	6.88E-09	4.98E-09	6.85E-09	9.93E-09	3.05E-09	1.68E-08	2.96E-09
CM247	1.08E-14	3.26E-15	7.96E-15	5.98E-15	8.69E-15	8.89E-15	6.43E-15	8.85E-15	1.28E-14	3.94E-15	2.17E-14	3.83E-15
CM248	1.31E-14	3.96E-15	9.67E-15	7.26E-15	1.06E-14	1.08E-14	7.81E-15	1.07E-14	1.56E-14	4.78E-15	2.63E-14	4.65E-15

Table F-24. (Part 3). Upper-bound activities associated with general plant waste disposals sent to RWMC from 1959 through 1983.

	Upper-bound inventory for waste stream INTEC-MOD-9H (1971-1983)												
Nuclide	1971 (Ci)	1972 (Ci)	1973 (Ci)	1974 (Ci)	1975 (Ci)	1976 (Ci)	1977 (Ci)	1978 (Ci)	1979 (Ci)	1980 (Ci)	1981 (Ci)	1982 (Ci)	1983 (Ci)
H3	3.69E-02	7.83E-02	2.71E-02	1.35E-01	1.08E-02	5.21E-02	4.01E-01	9.50E-01	3.38E-01	1.60E-01	2.00E-01	8.96E-02	1.62E-01
C14	4.94E-10	1.05E-09	3.63E-10	1.81E-09	1.44E-10	6.98E-10	5.37E-09	1.27E-08	4.53E-09	2.14E-09	2.68E-09	1.20E-09	2.16E-09
Cl36	2.08E-08	4.41E-08	1.53E-08	7.60E-08	6.08E-09	2.94E-08	2.26E-07	5.35E-07	1.91E-07	9.01E-08	1.13E-07	5.05E-08	9.10E-08
Co60	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ni59	1.62E-02	3.44E-02	1.19E-02	5.92E-02	4.73E-03	2.29E-02	1.76E-01	4.17E-01	1.48E-01	7.02E-02	8.78E-02	3.93E-02	7.09E-02
Ni63	4.34E-05	9.19E-05	3.19E-05	1.58E-04	1.27E-05	6.12E-05	4.71E-04	1.12E-03	3.97E-04	1.88E-04	2.35E-04	1.05E-04	1.90E-04
SR90	2.94E-03	6.24E-03	2.16E-03	1.08E-02	8.59E-04	4.15E-03	3.19E-02	7.57E-02	2.69E-02	1.27E-02	1.59E-02	7.14E-03	1.29E-02
NB94	1.32E+01	2.79E+01	9.67E+00	4.81E+01	3.84E+00	1.86E+01	1.43E+02	3.39E+02	1.21E+02	5.70E+01	7.13E+01	3.19E+01	5.76E+01
TC99	4.01E-09	8.49E-09	2.94E-09	1.46E-08	1.17E-09	5.65E-09	4.35E-08	1.03E-07	3.67E-08	1.73E-08	2.17E-08	9.72E-09	1.75E-08
I129	2.57E-03	5.45E-03	1.89E-03	9.40E-03	7.51E-04	3.63E-03	2.79E-02	6.62E-02	2.35E-02	1.11E-02	1.39E-02	6.24E-03	1.12E-02
CS137	4.15E-06	8.80E-06	3.05E-06	1.52E-05	1.21E-06	5.86E-06	4.51E-05	1.07E-04	3.80E-05	1.80E-05	2.25E-05	1.01E-05	1.82E-05
EU152	1.30E+01	2.75E+01	9.53E+00	4.74E+01	3.79E+00	1.83E+01	1.41E+02	3.34E+02	1.19E+02	5.62E+01	7.03E+01	3.15E+01	5.68E+01
EU154	9.21E-04	1.95E-03	6.77E-04	3.37E-03	2.69E-04	1.30E-03	1.00E-02	2.37E-02	8.44E-03	3.99E-03	4.99E-03	2.24E-03	4.03E-03
PB210	1.68E-01	3.57E-01	1.24E-01	6.15E-01	4.91E-02	2.37E-01	1.83E+00	4.33E+00	1.54E+00	7.28E-01	9.11E-01	4.08E-01	7.36E-01
RA226	3.38E-11	7.16E-11	2.48E-11	1.23E-10	9.87E-12	4.77E-11	3.67E-10	8.69E-10	3.09E-10	1.46E-10	1.83E-10	8.20E-11	1.48E-10
RA228	4.78E-09	1.01E-08	3.51E-09	1.75E-08	1.39E-09	6.74E-09	5.18E-08	1.23E-07	1.50E-01	2.07E-08	2.59E-08	1.16E-08	2.09E-08
AC227	7.22E-13	1.53E-12	5.30E-13	2.64E-12	2.11E-13	1.02E-12	7.83E-12	1.86E-11	6.61E-12	3.12E-12	3.91E-12	1.75E-12	3.16E-12
TH228	1.24E-09	2.63E-09	9.11E-10	4.53E-09	3.62E-10	1.75E-09	1.35E-08	3.19E-08	1.14E-08	5.37E-09	6.71E-09	3.01E-09	5.42E-09
TH229	2.23E-04	4.72E-04	1.63E-04	8.13E-04	6.50E-05	3.14E-04	2.41E-03	5.73E-03	2.04E-03	9.63E-04	1.21E-03	5.40E-04	9.74E-04
TH230	1.03E-11	2.17E-11	7.53E-12	3.75E-11	3.00E-12	1.45E-11	1.11E-10	2.64E-10	9.39E-11	4.44E-11	5.55E-11	2.49E-11	4.49E-11
TH232	1.79E-08	3.79E-08	1.31E-08	6.54E-08	5.22E-09	2.52E-08	1.94E-07	4.60E-07	1.64E-07	7.74E-08	9.69E-08	4.34E-08	7.83E-08
PA231	3.36E-14	7.13E-14	2.47E-14	1.23E-13	9.82E-15	4.74E-14	3.65E-13	8.65E-13	3.08E-13	1.46E-13	1.82E-13	8.16E-14	1.47E-13

Table continued next page

Table F-24. (Part 4). Upper-bound activities associated with general plant waste disposals sent to RWMC from 1959 through -1983.

Upper-bound inventory for waste stream INTEC-MOD-9H (1971-1983)													
Nuclide	1971 (Ci)	1972 (Ci)	1973 (Ci)	1974 (Ci)	1975 (Ci)	1976 (Ci)	1977 (Ci)	1978 (Ci)	1979 (Ci)	1980 (Ci)	1981 (Ci)	1982 (Ci)	1983 (Ci)
U232	4.50E-07	9.53E-07	3.30E-07	1.64E-06	1.31E-07	6.34E-07	4.88E-06	1.16E-05	4.12E-06	1.95E-06	2.44E-06	1.09E-06	1.97E-06
U233	6.43E-10	1.36E-09	4.72E-10	2.35E-09	1.88E-10	9.07E-10	6.98E-09	1.65E-08	5.89E-09	2.78E-09	3.48E-09	1.56E-09	2.81E-09
U234	4.55E-05	9.64E-05	3.34E-05	1.66E-04	1.33E-05	6.42E-05	4.94E-04	1.17E-03	4.17E-04	1.97E-04	2.46E-04	1.10E-04	1.99E-04
U235	2.97E-07	6.29E-07	2.18E-07	1.08E-06	8.67E-08	4.19E-07	3.22E-06	7.63E-06	2.72E-06	1.28E-06	1.61E-06	7.20E-07	1.30E-06
U236	7.42E-07	1.57E-06	5.45E-07	2.71E-06	2.17E-07	1.05E-06	8.05E-06	1.91E-05	6.79E-06	3.21E-06	4.02E-06	1.80E-06	3.25E-06
U238	1.53E-08	3.25E-08	1.13E-08	5.60E-08	4.48E-09	2.16E-08	1.66E-07	3.94E-07	1.40E-07	6.64E-08	8.30E-08	3.72E-08	6.71E-08
NP237	4.45E-06	9.43E-06	3.27E-06	1.63E-05	1.30E-06	6.28E-06	4.83E-05	1.15E-04	4.08E-05	1.93E-05	2.41E-05	1.08E-05	1.95E-05
PU238	5.41E-02	1.15E-01	3.98E-02	1.98E-01	1.58E-02	7.64E-02	5.87E-01	1.39E+00	4.96E-01	2.34E-01	2.93E-01	1.31E-01	2.37E-01
PU239	8.90E-04	1.89E-03	6.54E-04	3.25E-03	2.60E-04	1.26E-03	9.66E-03	2.29E-02	8.15E-03	3.85E-03	4.82E-03	2.16E-03	3.90E-03
PU240	6.93E-04	1.47E-03	5.09E-04	2.53E-03	2.02E-04	9.78E-04	7.52E-03	1.78E-02	6.35E-03	3.00E-03	3.75E-03	1.68E-03	3.03E-03
PU241	7.88E-02	1.67E-01	5.79E-02	2.88E-01	2.30E-02	1.11E-01	8.55E-01	2.03E+00	7.21E-01	3.41E-01	4.27E-01	1.91E-01	3.45E-01
PU242	1.43E-06	3.04E-06	1.05E-06	5.24E-06	4.19E-07	2.02E-06	1.56E-05	3.69E-05	1.31E-05	6.21E-06	7.77E-06	3.48E-06	6.27E-06
Pu244	2.18E-14	4.61E-14	1.60E-14	7.95E-14	6.35E-15	3.07E-14	2.36E-13	5.60E-13	1.99E-13	9.42E-14	1.18E-13	5.28E-14	9.52E-14
AM241	3.84E-03	8.15E-03	2.82E-03	1.40E-02	1.12E-03	5.42E-03	4.17E-02	9.89E-02	3.52E-02	1.66E-02	2.08E-02	9.33E-03	1.68E-02
AM243	3.63E-05	7.70E-05	2.67E-05	1.33E-04	1.06E-05	5.12E-05	3.94E-04	9.34E-04	3.33E-04	1.57E-04	1.97E-04	8.81E-05	1.59E-04
Cm243	1.15E-06	2.44E-06	8.45E-07	4.20E-06	3.36E-07	1.62E-06	1.25E-05	2.96E-05	1.05E-05	4.98E-06	6.23E-06	2.79E-06	5.03E-06
CM244	7.07E-05	1.50E-04	5.19E-05	2.58E-04	2.06E-05	9.97E-05	7.67E-04	1.82E-03	6.47E-04	3.06E-04	3.83E-04	1.72E-04	3.09E-04
CM245	6.39E-09	1.35E-08	4.69E-09	2.33E-08	1.87E-09	9.02E-09	6.93E-08	1.64E-07	5.85E-08	2.77E-08	3.46E-08	1.55E-08	2.80E-08
CM246	5.07E-10	1.08E-09	3.73E-10	1.85E-09	1.48E-10	7.16E-10	5.51E-09	1.31E-08	4.65E-09	2.20E-09	2.75E-09	1.23E-09	2.22E-09
CM247	6.55E-16	1.39E-15	4.82E-16	2.40E-15	1.91E-16	9.25E-16	7.11E-15	1.69E-14	6.00E-15	2.84E-15	3.55E-15	1.59E-15	2.87E-15
CM248	7.96E-16	1.69E-15	5.85E-16	2.91E-15	2.32E-16	1.12E-15	8.64E-15	2.05E-14	7.29E-15	3.45E-15	4.31E-15	1.93E-15	3.48E-15

Table F-25. Lower-bound activities associated with general plant waste disposals sent to RWMC from 1959 through 1983. (These inventories are included in the INTEC-MOD-9H waste stream).

<u>Lower-bound inventory for waste stream INTEC-MOD-9H (1959-1970)</u>												
Nuclide	1959 (Ci)	1960 (Ci)	1961 (Ci)	1962 (Ci)	1963 (Ci)	1964 (Ci)	1965 (Ci)	1966 (Ci)	1967 (Ci)	1968 (Ci)	1969 (Ci)	1970 (Ci)
H3	2.70E-01	8.16E-02	1.99E-01	1.50E-01	2.18E-01	2.23E-01	1.61E-01	2.22E-01	3.21E-01	9.86E-02	5.43E-01	9.58E-02
C14	3.61E-09	1.09E-09	2.67E-09	2.00E-09	2.92E-09	2.98E-09	2.16E-09	2.97E-09	4.30E-09	1.32E-09	7.27E-09	1.28E-09
Cl36	1.52E-07	4.60E-08	1.12E-07	8.43E-08	1.23E-07	1.25E-07	9.07E-08	1.25E-07	1.81E-07	5.55E-08	3.06E-07	5.40E-08
Co60	0.00E+00											
Ni59	1.18E-01	3.58E-02	8.75E-02	6.57E-02	9.55E-02	9.77E-02	7.07E-02	9.73E-02	1.41E-01	4.32E-02	2.38E-01	4.20E-02
Ni63	3.17E-04	9.58E-05	2.34E-04	1.76E-04	2.56E-04	2.61E-04	1.89E-04	2.60E-04	3.77E-04	1.16E-04	6.38E-04	1.13E-04
SR90	2.15E-02	6.50E-03	1.59E-02	1.19E-02	1.73E-02	1.77E-02	1.28E-02	1.77E-02	2.56E-02	7.85E-03	4.33E-02	7.63E-03
NB94	9.61E+01	2.91E+01	7.11E+01	5.33E+01	7.76E+01	7.93E+01	5.74E+01	7.90E+01	1.15E+02	3.51E+01	1.94E+02	3.41E+01
TC99	2.92E-08	8.85E-09	2.16E-08	1.62E-08	2.36E-08	2.41E-08	1.75E-08	2.40E-08	3.49E-08	1.07E-08	5.89E-08	1.04E-08
I129	1.88E-02	5.68E-03	1.39E-02	1.04E-02	1.52E-02	1.55E-02	1.12E-02	1.54E-02	2.24E-02	6.86E-03	3.78E-02	6.67E-03
CS137	3.03E-05	9.18E-06	2.24E-05	1.68E-05	2.45E-05	2.50E-05	1.81E-05	2.49E-05	3.61E-05	1.11E-05	6.11E-05	1.08E-05
EU152	9.47E+01	2.87E+01	7.00E+01	5.26E+01	7.65E+01	7.82E+01	5.66E+01	7.79E+01	1.13E+02	3.46E+01	1.91E+02	3.37E+01
EU154	6.73E-03	2.04E-03	4.97E-03	3.73E-03	5.43E-03	5.55E-03	4.02E-03	5.53E-03	8.02E-03	2.46E-03	1.35E-02	2.39E-03
PB210	1.23E+00	3.72E-01	9.08E-01	6.82E-01	9.92E-01	1.01E+00	7.34E-01	1.01E+00	1.46E+00	4.49E-01	2.47E+00	4.37E-01
RA226	2.47E-10	7.46E-11	1.82E-10	1.37E-10	1.99E-10	2.04E-10	1.47E-10	2.03E-10	2.94E-10	9.01E-11	4.97E-10	8.76E-11
RA228	3.49E-08	1.06E-08	2.58E-08	1.94E-08	2.82E-08	2.88E-08	2.08E-08	2.87E-08	4.16E-08	1.27E-08	7.02E-08	1.24E-08
AC227	5.27E-12	1.59E-12	3.90E-12	2.93E-12	4.26E-12	4.35E-12	3.15E-12	4.33E-12	6.28E-12	1.93E-12	1.06E-11	1.87E-12
TH228	9.05E-09	2.74E-09	6.69E-09	5.02E-09	7.31E-09	7.47E-09	5.41E-09	7.44E-09	1.08E-08	3.31E-09	1.82E-08	3.22E-09
TH229	1.62E-03	4.92E-04	1.20E-03	9.02E-04	1.31E-03	1.34E-03	9.70E-04	1.34E-03	1.94E-03	5.94E-04	3.27E-03	5.77E-04
TH230	7.48E-11	2.27E-11	5.54E-11	4.16E-11	6.05E-11	6.18E-11	4.47E-11	6.15E-11	8.92E-11	2.74E-11	1.51E-10	2.66E-11
TH232	1.31E-07	3.95E-08	9.66E-08	7.25E-08	1.05E-07	1.08E-07	7.80E-08	1.07E-07	1.56E-07	4.77E-08	2.63E-07	4.64E-08
PA231	2.45E-13	7.43E-14	1.81E-13	1.36E-13	1.98E-13	2.03E-13	1.47E-13	2.02E-13	2.92E-13	8.97E-14	4.94E-13	8.72E-14

Table continued next page

Table F-25. (Part 2). Lower-bound activities associated with general plant waste disposals sent to RWMC from 1952 through 1983.

<u>Lower-bound inventory for waste stream INTEC-MOD-9H (1959-1970)</u>												
Nuclide	1959 (Ci)	1960 (Ci)	1961 (Ci)	1962 (Ci)	1963 (Ci)	1964 (Ci)	1965 (Ci)	1966 (Ci)	1967 (Ci)	1968 (Ci)	1969 (Ci)	1970 (Ci)
U232	3.28E-06	9.93E-07	2.43E-06	1.82E-06	2.65E-06	2.71E-06	1.96E-06	2.70E-06	3.91E-06	1.20E-06	6.61E-06	1.17E-06
U233	4.69E-09	1.42E-09	3.47E-09	2.61E-09	3.79E-09	3.87E-09	2.80E-09	3.86E-09	5.59E-09	1.72E-09	9.45E-09	1.67E-09
U234	3.32E-04	1.01E-04	2.46E-04	1.84E-04	2.68E-04	2.74E-04	1.98E-04	2.73E-04	3.96E-04	1.21E-04	6.69E-04	1.18E-04
U235	2.17E-06	6.55E-07	1.60E-06	1.20E-06	1.75E-06	1.79E-06	1.29E-06	1.78E-06	2.58E-06	7.92E-07	4.36E-06	7.70E-07
U236	5.41E-06	1.64E-06	4.00E-06	3.01E-06	4.37E-06	4.47E-06	3.23E-06	4.45E-06	6.45E-06	1.98E-06	1.09E-05	1.92E-06
U238	1.12E-07	3.39E-08	8.27E-08	6.21E-08	9.04E-08	9.24E-08	6.68E-08	9.20E-08	1.33E-07	4.09E-08	2.25E-07	3.98E-08
NP237	3.25E-05	9.83E-06	2.40E-05	1.80E-05	2.62E-05	2.68E-05	1.94E-05	2.67E-05	3.87E-05	1.19E-05	6.54E-05	1.15E-05
PU238	3.95E-01	1.20E-01	2.92E-01	2.19E-01	3.19E-01	3.26E-01	2.36E-01	3.25E-01	4.71E-01	1.44E-01	7.96E-01	1.40E-01
PU239	6.50E-03	1.97E-03	4.81E-03	3.61E-03	5.25E-03	5.37E-03	3.88E-03	5.34E-03	7.75E-03	2.38E-03	1.31E-02	2.31E-03
PU240	5.06E-03	1.53E-03	3.74E-03	2.81E-03	4.09E-03	4.18E-03	3.02E-03	4.16E-03	6.03E-03	1.85E-03	1.02E-02	1.80E-03
PU241	5.75E-01	1.74E-01	4.25E-01	3.19E-01	4.64E-01	4.75E-01	3.43E-01	4.73E-01	6.85E-01	2.10E-01	1.16E+00	2.04E-01
PU242	1.05E-05	3.17E-06	7.74E-06	5.81E-06	8.45E-06	8.64E-06	6.25E-06	8.61E-06	1.25E-05	3.83E-06	2.11E-05	3.72E-06
Pu244	1.59E-13	4.81E-14	1.17E-13	8.82E-14	1.28E-13	1.31E-13	9.48E-14	1.31E-13	1.89E-13	5.81E-14	3.20E-13	5.64E-14
AM241	2.81E-02	8.49E-03	2.07E-02	1.56E-02	2.27E-02	2.32E-02	1.68E-02	2.31E-02	3.34E-02	1.03E-02	5.65E-02	9.97E-03
AM243	2.65E-04	8.02E-05	1.96E-04	1.47E-04	2.14E-04	2.19E-04	1.58E-04	2.18E-04	3.16E-04	9.69E-05	5.34E-04	9.42E-05
Cm243	8.39E-06	2.54E-06	6.21E-06	4.66E-06	6.78E-06	6.93E-06	5.01E-06	6.90E-06	1.00E-05	3.07E-06	1.69E-05	2.98E-06
CM244	5.16E-04	1.56E-04	3.82E-04	2.86E-04	4.17E-04	4.26E-04	3.08E-04	4.24E-04	6.15E-04	1.89E-04	1.04E-03	1.83E-04
CM245	4.66E-08	1.41E-08	3.45E-08	2.59E-08	3.77E-08	3.85E-08	2.79E-08	3.83E-08	5.56E-08	1.71E-08	9.40E-08	1.66E-08
CM246	3.70E-09	1.12E-09	2.74E-09	2.06E-09	2.99E-09	3.06E-09	2.21E-09	3.04E-09	4.41E-09	1.35E-09	7.46E-09	1.32E-09
CM247	4.78E-15	1.45E-15	3.54E-15	2.66E-15	3.86E-15	3.95E-15	2.86E-15	3.93E-15	5.70E-15	1.75E-15	9.64E-15	1.70E-15
CM248	5.81E-15	1.76E-15	4.30E-15	3.23E-15	4.69E-15	4.80E-15	3.47E-15	4.78E-15	6.92E-15	2.12E-15	1.17E-14	2.06E-15

Table F-25. (Part 3). Lower-bound activities associated with general plant waste disposals sent to RWMC from 1959 through 1983.

<u>Lower-bound inventory for waste stream INTEC-MOD-9H (1971-1983)</u>													
Nuclide	1971 (Ci)	1972 (Ci)	1973 (Ci)	1974 (Ci)	1975 (Ci)	1976 (Ci)	1977 (Ci)	1978 (Ci)	1979 (Ci)	1980 (Ci)	1981 (Ci)	1982 (Ci)	1983 (Ci)
H3	1.64E-02	3.48E-02	1.21E-02	6.00E-02	4.79E-03	2.32E-02	1.78E-01	4.22E-01	1.50E-01	7.11E-02	8.89E-02	3.98E-02	7.18E-02
C14	2.20E-10	4.66E-10	1.61E-10	8.03E-10	6.42E-11	3.10E-10	2.38E-09	5.65E-09	2.01E-09	9.51E-10	1.19E-09	5.33E-10	9.61E-10
Cl36	9.24E-09	1.96E-08	6.79E-09	3.38E-08	2.70E-09	1.30E-08	1.00E-07	2.38E-07	8.47E-08	4.00E-08	5.01E-08	2.24E-08	4.05E-08
Co60	0.00E+00												
Ni59	7.20E-03	1.53E-02	5.29E-03	2.63E-02	2.10E-03	1.02E-02	7.82E-02	1.85E-01	6.60E-02	3.12E-02	3.90E-02	1.75E-02	3.15E-02
Ni63	1.93E-05	4.09E-05	1.42E-05	7.04E-05	5.63E-06	2.72E-05	2.09E-04	4.96E-04	1.77E-04	8.35E-05	1.04E-04	4.68E-05	8.43E-05
SR90	1.31E-03	2.77E-03	9.60E-04	4.78E-03	3.82E-04	1.84E-03	1.42E-02	3.36E-02	1.20E-02	5.66E-03	7.08E-03	3.17E-03	5.72E-03
NB94	5.85E+00	1.24E+01	4.30E+00	2.14E+01	1.71E+00	8.25E+00	6.35E+01	1.51E+02	5.36E+01	2.53E+01	3.17E+01	1.42E+01	2.56E+01
TC99	1.78E-09	3.78E-09	1.31E-09	6.51E-09	5.20E-10	2.51E-09	1.93E-08	4.58E-08	1.63E-08	7.71E-09	9.64E-09	4.32E-09	7.79E-09
I129	1.14E-03	2.42E-03	8.40E-04	4.18E-03	3.34E-04	1.61E-03	1.24E-02	2.94E-02	1.05E-02	4.95E-03	6.19E-03	2.77E-03	5.00E-03
CS137	1.85E-06	3.91E-06	1.36E-06	6.75E-06	5.39E-07	2.60E-06	2.00E-05	4.75E-05	1.69E-05	7.99E-06	1.00E-05	4.48E-06	8.08E-06
EU152	5.77E+00	1.22E+01	4.24E+00	2.11E+01	1.68E+00	8.14E+00	6.26E+01	1.48E+02	5.28E+01	2.50E+01	3.12E+01	1.40E+01	2.52E+01
EU154	4.09E-04	8.68E-04	3.01E-04	1.50E-03	1.20E-04	5.78E-04	4.44E-03	1.05E-02	3.75E-03	1.77E-03	2.22E-03	9.94E-04	1.79E-03
PB210	7.48E-02	1.59E-01	5.49E-02	2.73E-01	2.18E-02	1.06E-01	8.11E-01	1.92E+00	6.85E-01	3.24E-01	4.05E-01	1.81E-01	3.27E-01
RA226	1.50E-11	3.18E-11	1.10E-11	5.49E-11	4.38E-12	2.12E-11	1.63E-10	3.86E-10	1.37E-10	6.50E-11	8.13E-11	3.64E-11	6.57E-11
RA228	2.12E-09	4.50E-09	1.56E-09	7.76E-09	6.20E-10	2.99E-09	2.30E-08	5.46E-08	6.67E-02	9.19E-09	1.15E-08	5.15E-09	9.29E-09
AC227	3.21E-13	6.80E-13	2.36E-13	1.17E-12	9.37E-14	4.53E-13	3.48E-12	8.26E-12	2.94E-12	1.39E-12	1.74E-12	7.79E-13	1.40E-12
TH228	5.51E-10	1.17E-09	4.05E-10	2.01E-09	1.61E-10	7.77E-10	5.98E-09	1.42E-08	5.05E-09	2.39E-09	2.98E-09	1.34E-09	2.41E-09
TH229	9.89E-05	2.10E-04	7.27E-05	3.61E-04	2.89E-05	1.40E-04	1.07E-03	2.55E-03	9.06E-04	4.28E-04	5.36E-04	2.40E-04	4.33E-04
TH230	4.56E-12	9.66E-12	3.35E-12	1.67E-11	1.33E-12	6.43E-12	4.94E-11	1.17E-10	4.17E-11	1.97E-11	2.47E-11	1.11E-11	1.99E-11
TH232	7.95E-09	1.69E-08	5.84E-09	2.91E-08	2.32E-09	1.12E-08	8.63E-08	2.05E-07	7.28E-08	3.44E-08	4.31E-08	1.93E-08	3.48E-08
PA231	1.49E-14	3.17E-14	1.10E-14	5.46E-14	4.36E-15	2.11E-14	1.62E-13	3.84E-13	1.37E-13	6.47E-14	8.09E-14	3.63E-14	6.54E-14

Table continued next page

Table F-25. (Part 4). Lower-bound activities associated with general plant waste disposals sent to RWMC from 1959 through 1983.

	<u>Lower-bound inventory for waste stream INTEC-MOD-9H (1971-1983)</u>												
Nuclide	1971 (Ci)	1972 (Ci)	1973 (Ci)	1974 (Ci)	1975 (Ci)	1976 (Ci)	1977 (Ci)	1978 (Ci)	1979 (Ci)	1980 (Ci)	1981 (Ci)	1982 (Ci)	1983 (Ci)
U232	2.00E-07	4.24E-07	1.47E-07	7.30E-07	5.84E-08	2.82E-07	2.17E-06	5.14E-06	1.83E-06	8.65E-07	1.08E-06	4.85E-07	8.74E-07
U233	2.86E-10	6.06E-10	2.10E-10	1.04E-09	8.34E-11	4.03E-10	3.10E-09	7.35E-09	2.62E-09	1.24E-09	1.55E-09	6.93E-10	1.25E-09
U234	2.02E-05	4.29E-05	1.49E-05	7.39E-05	5.91E-06	2.85E-05	2.19E-04	5.20E-04	1.85E-04	8.75E-05	1.09E-04	4.91E-05	8.85E-05
U235	1.32E-07	2.80E-07	9.69E-08	4.82E-07	3.85E-08	1.86E-07	1.43E-06	3.39E-06	1.21E-06	5.71E-07	7.14E-07	3.20E-07	5.77E-07
U236	3.30E-07	6.99E-07	2.42E-07	1.20E-06	9.63E-08	4.65E-07	3.58E-06	8.48E-06	3.02E-06	1.43E-06	1.79E-06	8.00E-07	1.44E-06
U238	6.81E-09	1.44E-08	5.00E-09	2.49E-08	1.99E-09	9.61E-09	7.39E-08	1.75E-07	6.24E-08	2.95E-08	3.69E-08	1.65E-08	2.98E-08
NP237	1.98E-06	4.19E-06	1.45E-06	7.23E-06	5.78E-07	2.79E-06	2.15E-05	5.09E-05	1.81E-05	8.56E-06	1.07E-05	4.80E-06	8.65E-06
PU238	2.41E-02	5.10E-02	1.77E-02	8.79E-02	7.03E-03	3.39E-02	2.61E-01	6.19E-01	2.20E-01	1.04E-01	1.30E-01	5.84E-02	1.05E-01
PU239	3.96E-04	8.39E-04	2.91E-04	1.45E-03	1.16E-04	5.58E-04	4.29E-03	1.02E-02	3.62E-03	1.71E-03	2.14E-03	9.60E-04	1.73E-03
PU240	3.08E-04	6.53E-04	2.26E-04	1.13E-03	9.00E-05	4.35E-04	3.34E-03	7.93E-03	2.82E-03	1.33E-03	1.67E-03	7.48E-04	1.35E-03
PU241	3.50E-02	7.42E-02	2.57E-02	1.28E-01	1.02E-02	4.94E-02	3.80E-01	9.01E-01	3.21E-01	1.52E-01	1.90E-01	8.49E-02	1.53E-01
PU242	6.37E-07	1.35E-06	4.68E-07	2.33E-06	1.86E-07	8.99E-07	6.92E-06	1.64E-05	5.84E-06	2.76E-06	3.45E-06	1.55E-06	2.79E-06
Pu244	9.67E-15	2.05E-14	7.10E-15	3.53E-14	2.82E-15	1.36E-14	1.05E-13	2.49E-13	8.86E-14	4.19E-14	5.24E-14	2.35E-14	4.23E-14
AM241	1.71E-03	3.62E-03	1.25E-03	6.24E-03	4.99E-04	2.41E-03	1.85E-02	4.40E-02	1.56E-02	7.39E-03	9.25E-03	4.15E-03	7.47E-03
AM243	1.61E-05	3.42E-05	1.19E-05	5.90E-05	4.71E-06	2.28E-05	1.75E-04	4.15E-04	1.48E-04	6.99E-05	8.74E-05	3.92E-05	7.06E-05
Cm243	5.11E-07	1.08E-06	3.75E-07	1.87E-06	1.49E-07	7.21E-07	5.54E-06	1.31E-05	4.68E-06	2.21E-06	2.77E-06	1.24E-06	2.24E-06
CM244	3.14E-05	6.66E-05	2.31E-05	1.15E-04	9.18E-06	4.43E-05	3.41E-04	8.08E-04	2.88E-04	1.36E-04	1.70E-04	7.62E-05	1.37E-04
CM245	2.84E-09	6.02E-09	2.09E-09	1.04E-08	8.29E-10	4.01E-09	3.08E-08	7.31E-08	2.60E-08	1.23E-08	1.54E-08	6.89E-09	1.24E-08
CM246	2.25E-10	4.78E-10	1.66E-10	8.24E-10	6.59E-11	3.18E-10	2.45E-09	5.80E-09	2.07E-09	9.76E-10	1.22E-09	5.47E-10	9.87E-10
CM247	2.91E-16	6.18E-16	2.14E-16	1.06E-15	8.51E-17	4.11E-16	3.16E-15	7.50E-15	2.67E-15	1.26E-15	1.58E-15	7.07E-16	1.27E-15
CM248	3.54E-16	7.50E-16	2.60E-16	1.29E-15	1.03E-16	4.99E-16	3.84E-15	9.10E-15	3.24E-15	1.53E-15	1.92E-15	8.58E-16	1.55E-15

F-11. RECENT AND PROJECTED DATA TASK WASTE

Generally, the reassessment of data for 1984 through 1993 indicated that original HDT waste streams were reasonably complete. However, to develop updated isotopic profiles more efficiently, waste stream descriptions were redefined using methods similar to those for the HDT period.

All shipments of general plant waste containing contaminants from fission products were reclassified and combined into waste stream INTEC-MOD-1R. Although actinides were not explicitly identified as contaminants in this waste stream, trace contamination existed. These contact-handled shipments of general plant waste resulted from routine plant operations, including decontamination activities, repairs, and equipment replacement and removal.

All known filter waste was reclassified as INTEC-MOD-2R. These particular LLW streams appeared to have higher concentrations of contaminants relative to most of the general plant waste streams and were therefore broken out separately. The majority of the identified filter waste came from the atmospheric protection system. In addition to reported fission product contamination, there were also trace amounts of actinides in these filter disposals. Filter waste disposals showed intermittent patterns and were not explicitly reported for every year from 1984 through 1993. Known disposals of filters to the SDA ended after 1988.

Similarly, explicitly identified hot cell waste (sometimes referred to as dry active waste) was a separately identified waste stream because it had higher contaminant concentrations relative to most general plant waste disposals. Hot cell waste was identified as INTEC-MOD-3R. Most known disposals came from CPP-610. This stream contained fission products, but there was no estimate of accompanying actinides. It was concluded that this stream also had to contain trace actinide contaminants since these streams were related to operations that handled fuel or dissolved fuel products. Known disposals of explicitly identified hot cell waste to the SDA ended after 1988.

Table F-26. Best-estimate activities associated with general plant waste disposals sent to RWMC from 1983 through 1993. (These inventories are included in the INTEC-MOD-1R waste stream).

Nuclide	1984 (Ci)	1985 (Ci)	1986 (Ci)	1987 (Ci)	1988 (Ci)	1989 (Ci)	1990 (Ci)	1991 (Ci)	1992 (Ci)	1993 (Ci)
H-3	4.68E-02	5.31E-02	3.04E-02	1.91E-01	6.18E-02	4.83E-02	9.03E-02	1.01E-02	9.07E-04	3.07E-05
Be-10	6.3E-10	7.1E-10	4.1E-10	2.6E-09	8.3E-10	6.5E-10	1.2E-09	1.4E-10	1.2E-11	4.1E-13
C-14	2.6E-08	3.0E-08	1.7E-08	1.1E-07	3.5E-08	2.7E-08	5.1E-08	5.7E-09	5.1E-10	1.7E-11
Cl-36	0.0E+00									
Co-60	2.1E-02	2.3E-02	1.3E-02	8.4E-02	2.7E-02	2.1E-02	4.0E-02	4.4E-03	4.0E-04	1.3E-05
Ni-59	5.5E-05	6.2E-05	3.6E-05	2.2E-04	7.3E-05	5.7E-05	1.1E-04	1.2E-05	1.1E-06	3.6E-08
Ni-63	3.7E-03	4.2E-03	2.4E-03	1.5E-02	4.9E-03	3.8E-03	7.2E-03	8.0E-04	7.2E-05	2.4E-06
Sr-90	1.7E+01	1.9E+01	1.1E+01	6.8E+01	2.2E+01	1.7E+01	3.2E+01	3.6E+00	3.2E-01	1.1E-02
Nb-94	5.1E-09	5.8E-09	3.3E-09	2.1E-08	6.7E-09	5.2E-09	9.8E-09	1.1E-09	9.8E-11	3.3E-12
Tc-99	3.3E-03	3.7E-03	2.1E-03	1.3E-02	4.3E-03	3.4E-03	6.3E-03	7.0E-04	6.3E-05	2.1E-06
I-129	5.3E-06	6.0E-06	3.4E-06	2.1E-05	7.0E-06	5.4E-06	1.0E-05	1.1E-06	1.0E-07	3.5E-09
Cs-137	1.6E+01	1.9E+01	1.1E+01	6.7E+01	2.2E+01	1.7E+01	3.2E+01	3.5E+00	3.2E-01	1.1E-02
Eu-152	1.2E-03	1.3E-03	7.6E-04	4.8E-03	1.5E-03	1.2E-03	2.3E-03	2.5E-04	2.3E-05	7.7E-07
Eu-154	2.1E-01	2.4E-01	1.4E-01	8.7E-01	2.8E-01	2.2E-01	4.1E-01	4.6E-02	4.1E-03	1.4E-04
Pb-210	4.3E-11	4.9E-11	2.8E-11	1.7E-10	5.7E-11	4.4E-11	8.3E-11	9.2E-12	8.3E-13	2.8E-14
Ra-226	6.0E-09	6.9E-09	3.9E-09	2.5E-08	8.0E-09	6.2E-09	1.2E-08	1.3E-09	1.2E-10	4.0E-12
Ra-228	9.1E-13	1.0E-12	5.9E-13	3.7E-12	1.2E-12	9.4E-13	1.8E-12	2.0E-13	1.8E-14	6.0E-16
Ac-227	1.6E-09	1.8E-09	1.0E-09	6.4E-09	2.1E-09	1.6E-09	3.0E-09	3.4E-10	3.0E-11	1.0E-12
Th-228	2.8E-04	3.2E-04	1.8E-04	1.1E-03	3.7E-04	2.9E-04	5.4E-04	6.1E-05	5.5E-06	1.9E-07
Th-229	1.3E-11	1.5E-11	8.5E-12	5.3E-11	1.7E-11	1.3E-11	2.5E-11	2.8E-12	2.5E-13	8.5E-15
Th-230	2.3E-08	2.6E-08	1.5E-08	9.2E-08	3.0E-08	2.3E-08	4.4E-08	4.9E-09	4.4E-10	1.5E-11
Th-232	4.3E-14	4.8E-14	2.8E-14	1.7E-13	5.6E-14	4.4E-14	8.2E-14	9.2E-15	8.3E-16	2.8E-17
Pa-231	4.1E-09	4.7E-09	2.7E-09	1.7E-08	5.5E-09	4.3E-09	8.0E-09	8.9E-10	8.0E-11	2.7E-12
U-232	5.7E-07	6.5E-07	3.7E-07	2.3E-06	7.5E-07	5.9E-07	1.1E-06	1.2E-07	1.1E-08	3.7E-10
U-233	8.1E-10	9.2E-10	5.3E-10	3.3E-09	1.1E-09	8.4E-10	1.6E-09	1.8E-10	1.6E-11	5.4E-13
U-234	5.8E-05	6.5E-05	3.7E-05	2.4E-04	7.6E-05	5.9E-05	1.1E-04	1.2E-05	1.1E-06	3.8E-08
U-235	3.8E-07	4.3E-07	2.4E-07	1.5E-06	5.0E-07	3.9E-07	7.3E-07	8.1E-08	7.3E-09	2.5E-10
U-236	9.4E-07	1.1E-06	6.1E-07	3.8E-06	1.2E-06	9.7E-07	1.8E-06	2.0E-07	1.8E-08	6.2E-10
U-238	1.9E-08	2.2E-08	1.3E-08	7.9E-08	2.6E-08	2.0E-08	3.7E-08	4.2E-09	3.8E-10	1.3E-11
Np-237	5.6E-06	6.4E-06	3.7E-06	2.3E-05	7.4E-06	5.8E-06	1.1E-05	1.2E-06	1.1E-07	3.7E-09
Pu-238	6.9E-02	7.8E-02	4.5E-02	2.8E-01	9.1E-02	7.1E-02	1.3E-01	1.5E-02	1.3E-03	4.5E-05
Pu-239	1.1E-03	1.3E-03	7.3E-04	4.6E-03	1.5E-03	1.2E-03	2.2E-03	2.4E-04	2.2E-05	7.4E-07
Pu-240	8.8E-04	1.0E-03	5.7E-04	3.6E-03	1.2E-03	9.1E-04	1.7E-03	1.9E-04	1.7E-05	5.8E-07
Pu-241	1.0E-01	1.1E-01	6.5E-02	4.1E-01	1.3E-01	1.0E-01	1.9E-01	2.2E-02	1.9E-03	6.6E-05
Pu-242	1.8E-06	2.1E-06	1.2E-06	7.4E-06	2.4E-06	1.9E-06	3.5E-06	3.9E-07	3.5E-08	1.2E-09
Pu-244	2.8E-14	3.1E-14	1.8E-14	1.1E-13	3.6E-14	2.8E-14	5.3E-14	5.9E-15	5.3E-16	1.8E-17
Am-241	4.9E-03	5.5E-03	3.2E-03	2.0E-02	6.4E-03	5.0E-03	9.4E-03	1.0E-03	9.4E-05	3.2E-06
Am-243	4.6E-05	5.2E-05	3.0E-05	1.9E-04	6.1E-05	4.7E-05	8.9E-05	9.9E-06	8.9E-07	3.0E-08
Cm-243	1.5E-06	1.7E-06	9.5E-07	5.9E-06	1.9E-06	1.5E-06	2.8E-06	3.1E-07	2.8E-08	9.6E-10
Cm-244	9.0E-05	1.0E-04	5.8E-05	3.7E-04	1.2E-04	9.2E-05	1.7E-04	1.9E-05	1.7E-06	5.9E-08
Cm-245	8.1E-09	9.2E-09	5.3E-09	3.3E-08	1.1E-08	8.4E-09	1.6E-08	1.7E-09	1.6E-10	5.3E-12
Cm-246	6.4E-10	7.3E-10	4.2E-10	2.6E-09	8.5E-10	6.6E-10	1.2E-09	1.4E-10	1.2E-11	4.2E-13
Cm-247	8.3E-16	9.4E-16	5.4E-16	3.4E-15	1.1E-15	8.6E-16	1.6E-15	1.8E-16	1.6E-17	5.5E-19
Cm-248	1.0E-15	1.1E-15	6.6E-16	4.1E-15	1.3E-15	1.0E-15	1.9E-15	2.2E-16	2.0E-17	6.6E-19

Table F-27. Upper-bound activities associated with general plant waste disposals sent to RWMC from 1983 through 1993.

Nuclide	1984 (Ci)	1985 (Ci)	1986 (Ci)	1987 (Ci)	1988 (Ci)	1989 (Ci)	1990 (Ci)	1991 (Ci)	1992 (Ci)	1993 (Ci)
H-3	7.02E-02	7.96E-02	4.57E-02	2.86E-01	9.27E-02	7.24E-02	1.35E-01	1.51E-02	1.36E-03	4.61E-05
Be-10	9.4E-10	1.1E-09	6.1E-10	3.8E-09	1.2E-09	9.7E-10	1.8E-09	2.0E-10	1.8E-11	6.2E-13
C-14	4.0E-08	4.5E-08	2.6E-08	1.6E-07	5.2E-08	4.1E-08	7.6E-08	8.5E-09	7.7E-10	2.6E-11
Cl-36	0.0E+00									
Co-60	3.1E-02	3.5E-02	2.0E-02	1.3E-01	4.1E-02	3.2E-02	5.9E-02	6.6E-03	6.0E-04	2.0E-05
Ni-59	8.2E-05	9.3E-05	5.4E-05	3.4E-04	1.1E-04	8.5E-05	1.6E-04	1.8E-05	1.6E-06	5.4E-08
Ni-63	5.6E-03	6.3E-03	3.6E-03	2.3E-02	7.4E-03	5.8E-03	1.1E-02	1.2E-03	1.1E-04	3.7E-06
Sr-90	2.5E+01	2.8E+01	1.6E+01	1.0E+02	3.3E+01	2.6E+01	4.8E+01	5.4E+00	4.8E-01	1.6E-02
Nb-94	7.6E-09	8.6E-09	5.0E-09	3.1E-08	1.0E-08	7.9E-09	1.5E-08	1.6E-09	1.5E-10	5.0E-12
Tc-99	4.9E-03	5.5E-03	3.2E-03	2.0E-02	6.5E-03	5.0E-03	9.4E-03	1.1E-03	9.5E-05	3.2E-06
I-129	7.9E-06	9.0E-06	5.1E-06	3.2E-05	1.0E-05	8.1E-06	1.5E-05	1.7E-06	1.5E-07	5.2E-09
Cs-137	2.5E+01	2.8E+01	1.6E+01	1.0E+02	3.3E+01	2.5E+01	4.8E+01	5.3E+00	4.8E-01	1.6E-02
Eu-152	1.8E-03	2.0E-03	1.1E-03	7.1E-03	2.3E-03	1.8E-03	3.4E-03	3.8E-04	3.4E-05	1.2E-06
Eu-154	3.2E-01	3.6E-01	2.1E-01	1.3E+00	4.2E-01	3.3E-01	6.2E-01	6.9E-02	6.2E-03	2.1E-04
Pb-210	6.4E-11	7.3E-11	4.2E-11	2.6E-10	8.5E-11	6.6E-11	1.2E-10	1.4E-11	1.2E-12	4.2E-14
Ra-226	9.1E-09	1.0E-08	5.9E-09	3.7E-08	1.2E-08	9.4E-09	1.8E-08	2.0E-09	1.8E-10	6.0E-12
Ra-228	1.4E-12	1.6E-12	8.9E-13	5.6E-12	1.8E-12	1.4E-12	2.6E-12	3.0E-13	2.7E-14	9.0E-16
Ac-227	2.4E-09	2.7E-09	1.5E-09	9.6E-09	3.1E-09	2.4E-09	4.5E-09	5.1E-10	4.6E-11	1.5E-12
Th-228	4.2E-04	4.8E-04	2.8E-04	1.7E-03	5.6E-04	4.4E-04	8.2E-04	9.1E-05	8.2E-06	2.8E-07
Th-229	1.9E-11	2.2E-11	1.3E-11	7.9E-11	2.6E-11	2.0E-11	3.8E-11	4.2E-12	3.8E-13	1.3E-14
Th-230	3.4E-08	3.9E-08	2.2E-08	1.4E-07	4.5E-08	3.5E-08	6.6E-08	7.3E-09	6.6E-10	2.2E-11
Th-232	6.4E-14	7.2E-14	4.2E-14	2.6E-13	8.4E-14	6.6E-14	1.2E-13	1.4E-14	1.2E-15	4.2E-17
Pa-231	6.2E-09	7.0E-09	4.0E-09	2.5E-08	8.2E-09	6.4E-09	1.2E-08	1.3E-09	1.2E-10	4.1E-12
U-232	8.5E-07	9.7E-07	5.6E-07	3.5E-06	1.1E-06	8.8E-07	1.6E-06	1.8E-07	1.7E-08	5.6E-10
U-233	1.2E-09	1.4E-09	7.9E-10	5.0E-09	1.6E-09	1.3E-09	2.4E-09	2.6E-10	2.4E-11	8.0E-13
U-234	8.6E-05	9.8E-05	5.6E-05	3.5E-04	1.1E-04	8.9E-05	1.7E-04	1.9E-05	1.7E-06	5.7E-08
U-235	5.6E-07	6.4E-07	3.7E-07	2.3E-06	7.4E-07	5.8E-07	1.1E-06	1.2E-07	1.1E-08	3.7E-10
U-236	1.4E-06	1.6E-06	9.2E-07	5.7E-06	1.9E-06	1.5E-06	2.7E-06	3.0E-07	2.7E-08	9.3E-10
U-238	2.9E-08	3.3E-08	1.9E-08	1.2E-07	3.8E-08	3.0E-08	5.6E-08	6.3E-09	5.6E-10	1.9E-11
Np-237	8.5E-06	9.6E-06	5.5E-06	3.4E-05	1.1E-05	8.7E-06	1.6E-05	1.8E-06	1.6E-07	5.6E-09
Pu-238	1.0E-01	1.2E-01	6.7E-02	4.2E-01	1.4E-01	1.1E-01	2.0E-01	2.2E-02	2.0E-03	6.8E-05
Pu-239	1.7E-03	1.9E-03	1.1E-03	6.9E-03	2.2E-03	1.7E-03	3.3E-03	3.6E-04	3.3E-05	1.1E-06
Pu-240	1.3E-03	1.5E-03	8.6E-04	5.4E-03	1.7E-03	1.4E-03	2.5E-03	2.8E-04	2.6E-05	8.7E-07
Pu-241	1.5E-01	1.7E-01	9.7E-02	6.1E-01	2.0E-01	1.5E-01	2.9E-01	3.2E-02	2.9E-03	9.8E-05
Pu-242	2.7E-06	3.1E-06	1.8E-06	1.1E-05	3.6E-06	2.8E-06	5.3E-06	5.9E-07	5.3E-08	1.8E-09
Pu-244	4.1E-14	4.7E-14	2.7E-14	1.7E-13	5.5E-14	4.3E-14	8.0E-14	8.9E-15	8.0E-16	2.7E-17
Am-241	7.3E-03	8.3E-03	4.8E-03	3.0E-02	9.6E-03	7.5E-03	1.4E-02	1.6E-03	1.4E-04	4.8E-06
Am-243	6.9E-05	7.8E-05	4.5E-05	2.8E-04	9.1E-05	7.1E-05	1.3E-04	1.5E-05	1.3E-06	4.5E-08
Cm-243	2.2E-06	2.5E-06	1.4E-06	8.9E-06	2.9E-06	2.3E-06	4.2E-06	4.7E-07	4.2E-08	1.4E-09
Cm-244	1.3E-04	1.5E-04	8.7E-05	5.5E-04	1.8E-04	1.4E-04	2.6E-04	2.9E-05	2.6E-06	8.8E-08
Cm-245	1.2E-08	1.4E-08	7.9E-09	5.0E-08	1.6E-08	1.3E-08	2.3E-08	2.6E-09	2.4E-10	8.0E-12
Cm-246	9.6E-10	1.1E-09	6.3E-10	3.9E-09	1.3E-09	1.0E-09	1.9E-09	2.1E-10	1.9E-11	6.3E-13
Cm-247	1.2E-15	1.4E-15	8.1E-16	5.1E-15	1.6E-15	1.3E-15	2.4E-15	2.7E-16	2.4E-17	8.2E-19
Cm-248	1.5E-15	1.7E-15	9.8E-16	6.2E-15	2.0E-15	1.6E-15	2.9E-15	3.3E-16	2.9E-17	9.9E-19

Table F-28. Lower-bound activities associated with general plant waste disposals sent to RWMC from 1983 through 1993.

Nuclide	1984 (Ci)	1985 (Ci)	1986 (Ci)	1987 (Ci)	1988 (Ci)	1989 (Ci)	1990 (Ci)	1991 (Ci)	1992 (Ci)	1993 (Ci)
H-3	3.12E-02	3.54E-02	2.03E-02	1.27E-01	4.12E-02	3.22E-02	6.02E-02	6.72E-03	6.05E-04	2.05E-05
Be-10	4.2E-10	4.7E-10	2.7E-10	1.7E-09	5.5E-10	4.3E-10	8.1E-10	9.0E-11	8.1E-12	2.7E-13
C-14	1.8E-08	2.0E-08	1.1E-08	7.2E-08	2.3E-08	1.8E-08	3.4E-08	3.8E-09	3.4E-10	1.2E-11
Cl-36	0.0E+00									
Co-60	1.4E-02	1.6E-02	8.9E-03	5.6E-02	1.8E-02	1.4E-02	2.6E-02	3.0E-03	2.7E-04	9.0E-06
Ni-59	3.7E-05	4.2E-05	2.4E-05	1.5E-04	4.8E-05	3.8E-05	7.1E-05	7.9E-06	7.1E-07	2.4E-08
Ni-63	2.5E-03	2.8E-03	1.6E-03	1.0E-02	3.3E-03	2.6E-03	4.8E-03	5.4E-04	4.8E-05	1.6E-06
Sr-90	1.1E+01	1.3E+01	7.2E+00	4.5E+01	1.5E+01	1.1E+01	2.1E+01	2.4E+00	2.2E-01	7.3E-03
Nb-94	3.4E-09	3.8E-09	2.2E-09	1.4E-08	4.5E-09	3.5E-09	6.5E-09	7.3E-10	6.6E-11	2.2E-12
Tc-99	2.2E-03	2.5E-03	1.4E-03	8.9E-03	2.9E-03	2.2E-03	4.2E-03	4.7E-04	4.2E-05	1.4E-06
I-129	3.5E-06	4.0E-06	2.3E-06	1.4E-05	4.6E-06	3.6E-06	6.8E-06	7.6E-07	6.8E-08	2.3E-09
Cs-137	1.1E+01	1.2E+01	7.1E+00	4.5E+01	1.4E+01	1.1E+01	2.1E+01	2.4E+00	2.1E-01	7.2E-03
Eu-152	7.8E-04	8.8E-04	5.1E-04	3.2E-03	1.0E-03	8.0E-04	1.5E-03	1.7E-04	1.5E-05	5.1E-07
Eu-154	1.4E-01	1.6E-01	9.2E-02	5.8E-01	1.9E-01	1.5E-01	2.7E-01	3.1E-02	2.8E-03	9.3E-05
Pb-210	2.9E-11	3.2E-11	1.9E-11	1.2E-10	3.8E-11	2.9E-11	5.5E-11	6.1E-12	5.5E-13	1.9E-14
Ra-226	4.0E-09	4.6E-09	2.6E-09	1.6E-08	5.3E-09	4.2E-09	7.8E-09	8.7E-10	7.8E-11	2.7E-12
Ra-228	6.1E-13	6.9E-13	4.0E-13	2.5E-12	8.1E-13	6.3E-13	1.2E-12	1.3E-13	1.2E-14	4.0E-16
Ac-227	1.0E-09	1.2E-09	6.8E-10	4.3E-09	1.4E-09	1.1E-09	2.0E-09	2.3E-10	2.0E-11	6.9E-13
Th-228	1.9E-04	2.1E-04	1.2E-04	7.7E-04	2.5E-04	1.9E-04	3.6E-04	4.1E-05	3.6E-06	1.2E-07
Th-229	8.7E-12	9.8E-12	5.6E-12	3.5E-11	1.1E-11	8.9E-12	1.7E-11	1.9E-12	1.7E-13	5.7E-15
Th-230	1.5E-08	1.7E-08	9.8E-09	6.2E-08	2.0E-08	1.6E-08	2.9E-08	3.3E-09	2.9E-10	9.9E-12
Th-232	2.8E-14	3.2E-14	1.8E-14	1.2E-13	3.8E-14	2.9E-14	5.5E-14	6.1E-15	5.5E-16	1.9E-17
Pa-231	2.8E-09	3.1E-09	1.8E-09	1.1E-08	3.6E-09	2.8E-09	5.3E-09	5.9E-10	5.3E-11	1.8E-12
U-232	3.8E-07	4.3E-07	2.5E-07	1.5E-06	5.0E-07	3.9E-07	7.3E-07	8.2E-08	7.4E-09	2.5E-10
U-233	5.4E-10	6.2E-10	3.5E-10	2.2E-09	7.2E-10	5.6E-10	1.0E-09	1.2E-10	1.1E-11	3.6E-13
U-234	3.8E-05	4.4E-05	2.5E-05	1.6E-04	5.1E-05	4.0E-05	7.4E-05	8.3E-06	7.5E-07	2.5E-08
U-235	2.5E-07	2.8E-07	1.6E-07	1.0E-06	3.3E-07	2.6E-07	4.8E-07	5.4E-08	4.9E-09	1.6E-10
U-236	6.3E-07	7.1E-07	4.1E-07	2.6E-06	8.3E-07	6.5E-07	1.2E-06	1.4E-07	1.2E-08	4.1E-10
U-238	1.3E-08	1.5E-08	8.4E-09	5.3E-08	1.7E-08	1.3E-08	2.5E-08	2.8E-09	2.5E-10	8.5E-12
Np-237	3.8E-06	4.3E-06	2.4E-06	1.5E-05	5.0E-06	3.9E-06	7.3E-06	8.1E-07	7.3E-08	2.5E-09
Pu-238	4.6E-02	5.2E-02	3.0E-02	1.9E-01	6.0E-02	4.7E-02	8.8E-02	9.9E-03	8.9E-04	3.0E-05
Pu-239	7.5E-04	8.5E-04	4.9E-04	3.1E-03	9.9E-04	7.8E-04	1.5E-03	1.6E-04	1.5E-05	4.9E-07
Pu-240	5.9E-04	6.6E-04	3.8E-04	2.4E-03	7.7E-04	6.0E-04	1.1E-03	1.3E-04	1.1E-05	3.8E-07
Pu-241	6.6E-02	7.5E-02	4.3E-02	2.7E-01	8.8E-02	6.9E-02	1.3E-01	1.4E-02	1.3E-03	4.4E-05
Pu-242	1.2E-06	1.4E-06	7.9E-07	4.9E-06	1.6E-06	1.3E-06	2.3E-06	2.6E-07	2.3E-08	8.0E-10
Pu-244	1.8E-14	2.1E-14	1.2E-14	7.5E-14	2.4E-14	1.9E-14	3.5E-14	4.0E-15	3.6E-16	1.2E-17
Am-241	3.2E-03	3.7E-03	2.1E-03	1.3E-02	4.3E-03	3.4E-03	6.3E-03	7.0E-04	6.3E-05	2.1E-06
Am-243	3.1E-05	3.5E-05	2.0E-05	1.3E-04	4.1E-05	3.2E-05	5.9E-05	6.6E-06	5.9E-07	2.0E-08
Cm-243	9.7E-07	1.1E-06	6.3E-07	4.0E-06	1.3E-06	1.0E-06	1.9E-06	2.1E-07	1.9E-08	6.4E-10
Cm-244	6.0E-05	6.8E-05	3.9E-05	2.4E-04	7.9E-05	6.2E-05	1.2E-04	1.3E-05	1.2E-06	3.9E-08
Cm-245	5.4E-09	6.1E-09	3.5E-09	2.2E-08	7.1E-09	5.6E-09	1.0E-08	1.2E-09	1.0E-10	3.5E-12
Cm-246	4.3E-10	4.9E-10	2.8E-10	1.7E-09	5.7E-10	4.4E-10	8.3E-10	9.2E-11	8.3E-12	2.8E-13
Cm-247	5.5E-16	6.3E-16	3.6E-16	2.3E-15	7.3E-16	5.7E-16	1.1E-15	1.2E-16	1.1E-17	3.6E-19
Cm-248	6.7E-16	7.6E-16	4.4E-16	2.7E-15	8.9E-16	6.9E-16	1.3E-15	1.4E-16	1.3E-17	4.4E-19

Table F-29. Best-estimate activities associated with filter waste disposals sent to RWMC from 1983 through 1993. (These inventories are included in the INTEC-MOD-2R waste stream).

Nuclide	1984 (Ci)	1985 (Ci)	1986 (Ci)	1987 (Ci)	1988 (Ci)	1989 (Ci)	1990 (Ci)	1991 (Ci)	1992 (Ci)	1993 (Ci)
H-3	6.22E-02	1.05E-04	6.89E-03	0.00E+00	1.98E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Be-0	8.3E-10	1.4E-12	9.2E-11	0.0E+00	2.6E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
C-14	3.5E-08	5.9E-11	3.9E-09	0.0E+00	1.1E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cl-36	0.0E+00									
Co-60	2.7E-02	4.6E-05	3.0E-03	0.0E+00	8.7E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-59	7.3E-05	1.2E-07	8.1E-06	0.0E+00	2.3E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-63	5.0E-03	8.3E-06	5.5E-04	0.0E+00	1.6E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-90	2.2E+01	3.7E-02	2.5E+00	0.0E+00	7.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nb-94	6.8E-09	1.1E-11	7.5E-10	0.0E+00	2.1E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99	4.3E-03	7.3E-06	4.8E-04	0.0E+00	1.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-129	7.0E-06	1.2E-08	7.7E-07	0.0E+00	2.2E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cs-137	2.2E+01	3.7E-02	2.4E+00	0.0E+00	6.9E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-152	1.6E-03	2.6E-06	1.7E-04	0.0E+00	4.9E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-154	2.8E-01	4.8E-04	3.1E-02	0.0E+00	9.0E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pb-210	5.7E-11	9.6E-14	6.3E-12	0.0E+00	1.8E-11	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-226	8.0E-09	1.4E-11	8.9E-10	0.0E+00	2.6E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-228	1.2E-12	2.0E-15	1.3E-13	0.0E+00	3.9E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ac-227	2.1E-09	3.5E-12	2.3E-10	0.0E+00	6.6E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-228	3.7E-04	6.3E-07	4.1E-05	0.0E+00	1.2E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-229	1.7E-11	2.9E-14	1.9E-12	0.0E+00	5.5E-12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-230	3.0E-08	5.1E-11	3.3E-09	0.0E+00	9.6E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-232	5.7E-14	9.5E-17	6.3E-15	0.0E+00	1.8E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pa-231	5.5E-09	9.3E-12	6.1E-10	0.0E+00	1.7E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-232	7.6E-07	1.3E-09	8.4E-08	0.0E+00	2.4E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-233	1.1E-09	1.8E-12	1.2E-10	0.0E+00	3.4E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-234	7.7E-05	1.3E-07	8.5E-06	0.0E+00	2.4E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-235	5.0E-07	8.4E-10	5.5E-08	0.0E+00	1.6E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-236	1.2E-06	2.1E-09	1.4E-07	0.0E+00	4.0E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-238	2.6E-08	4.3E-11	2.9E-09	0.0E+00	8.2E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Np-237	7.5E-06	1.3E-08	8.3E-07	0.0E+00	2.4E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-238	9.1E-02	1.5E-04	1.0E-02	0.0E+00	2.9E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-239	1.5E-03	2.5E-06	1.7E-04	0.0E+00	4.8E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-240	1.2E-03	2.0E-06	1.3E-04	0.0E+00	3.7E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-241	1.3E-01	2.2E-04	1.5E-02	0.0E+00	4.2E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-242	2.4E-06	4.1E-09	2.7E-07	0.0E+00	7.7E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-244	3.7E-14	6.2E-17	4.1E-15	0.0E+00	1.2E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-241	6.5E-03	1.1E-05	7.2E-04	0.0E+00	2.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-243	6.1E-05	1.0E-07	6.8E-06	0.0E+00	1.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-243	1.9E-06	3.3E-09	2.1E-07	0.0E+00	6.2E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-244	1.2E-04	2.0E-07	1.3E-05	0.0E+00	3.8E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-245	1.1E-08	1.8E-11	1.2E-09	0.0E+00	3.4E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-246	8.5E-10	1.4E-12	9.5E-11	0.0E+00	2.7E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-247	1.1E-15	1.9E-18	1.2E-16	0.0E+00	3.5E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-248	1.3E-15	2.3E-18	1.5E-16	0.0E+00	4.3E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table F-30. Upper-bound activities associated with filter waste disposals sent to RWMC from 1983 through 1993. (These inventories are included in the INTEC-MOD-2R waste stream).

Nuclide	1984 (Ci)	1985 (Ci)	1986 (Ci)	1987 (Ci)	1988 (Ci)	1989 (Ci)	1990 (Ci)	1991 (Ci)	1992 (Ci)	1993 (Ci)
H-3	9.33E-02	1.57E-04	1.03E-02	0.00E+00	2.97E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Be-10	1.2E-09	2.1E-12	1.4E-10	0.0E+00	4.0E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
C-14	5.3E-08	8.8E-11	5.8E-09	0.0E+00	1.7E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cl-36	0.0E+00									
Co-60	4.1E-02	6.9E-05	4.5E-03	0.0E+00	1.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-59	1.1E-04	1.8E-07	1.2E-05	0.0E+00	3.5E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-63	7.4E-03	1.3E-05	8.2E-04	0.0E+00	2.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-90	3.3E+01	5.6E-02	3.7E+00	0.0E+00	1.1E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nb-94	1.0E-08	1.7E-11	1.1E-09	0.0E+00	3.2E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99	6.5E-03	1.1E-05	7.2E-04	0.0E+00	2.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-129	1.0E-05	1.8E-08	1.2E-06	0.0E+00	3.3E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cs-137	3.3E+01	5.5E-02	3.6E+00	0.0E+00	1.0E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-152	2.3E-03	3.9E-06	2.6E-04	0.0E+00	7.4E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-154	4.3E-01	7.2E-04	4.7E-02	0.0E+00	1.4E-01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pb-210	8.5E-11	1.4E-13	9.4E-12	0.0E+00	2.7E-11	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-226	1.2E-08	2.0E-11	1.3E-09	0.0E+00	3.8E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-228	1.8E-12	3.1E-15	2.0E-13	0.0E+00	5.8E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ac-227	3.1E-09	5.3E-12	3.5E-10	0.0E+00	1.0E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-228	5.6E-04	9.5E-07	6.2E-05	0.0E+00	1.8E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-229	2.6E-11	4.4E-14	2.9E-12	0.0E+00	8.2E-12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-230	4.5E-08	7.6E-11	5.0E-09	0.0E+00	1.4E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-232	8.5E-14	1.4E-16	9.4E-15	0.0E+00	2.7E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pa-231	8.2E-09	1.4E-11	9.1E-10	0.0E+00	2.6E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-232	1.1E-06	1.9E-09	1.3E-07	0.0E+00	3.6E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-233	1.6E-09	2.7E-12	1.8E-10	0.0E+00	5.2E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-234	1.1E-04	1.9E-07	1.3E-05	0.0E+00	3.7E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-235	7.5E-07	1.3E-09	8.3E-08	0.0E+00	2.4E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-236	1.9E-06	3.2E-09	2.1E-07	0.0E+00	6.0E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-238	3.9E-08	6.5E-11	4.3E-09	0.0E+00	1.2E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Np-237	1.1E-05	1.9E-08	1.2E-06	0.0E+00	3.6E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-238	1.4E-01	2.3E-04	1.5E-02	0.0E+00	4.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-239	2.3E-03	3.8E-06	2.5E-04	0.0E+00	7.1E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-240	1.8E-03	2.9E-06	1.9E-04	0.0E+00	5.6E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-241	2.0E-01	3.4E-04	2.2E-02	0.0E+00	6.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-242	3.6E-06	6.1E-09	4.0E-07	0.0E+00	1.2E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-244	5.5E-14	9.3E-17	6.1E-15	0.0E+00	1.7E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-241	9.7E-03	1.6E-05	1.1E-03	0.0E+00	3.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-243	9.2E-05	1.5E-07	1.0E-05	0.0E+00	2.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-243	2.9E-06	4.9E-09	3.2E-07	0.0E+00	9.2E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-244	1.8E-04	3.0E-07	2.0E-05	0.0E+00	5.7E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-245	1.6E-08	2.7E-11	1.8E-09	0.0E+00	5.1E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-246	1.3E-09	2.2E-12	1.4E-10	0.0E+00	4.1E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-247	1.7E-15	2.8E-18	1.8E-16	0.0E+00	5.3E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-248	2.0E-15	3.4E-18	2.2E-16	0.0E+00	6.4E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table F-31. Lower-bound activities associated with filter waste disposals sent to RWMC from 1983 through 1993. (These inventories are included in the INTEC-MOD-2R waste stream).

Nuclide	1984 (Ci)	1985 (Ci)	1986 (Ci)	1987 (Ci)	1988 (Ci)	1989 (Ci)	1990 (Ci)	1991 (Ci)	1992 (Ci)	1993 (Ci)
H-3	4.15E-02	6.98E-05	4.59E-03	0.00E+00	1.32E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Be-10	5.6E-10	9.3E-13	6.1E-11	0.0E+00	1.8E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
C-14	2.3E-08	3.9E-11	2.6E-09	0.0E+00	7.4E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cl-36	0.0E+00									
Co-60	1.8E-02	3.1E-05	2.0E-03	0.0E+00	5.8E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-59	4.9E-05	8.2E-08	5.4E-06	0.0E+00	1.5E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-63	3.3E-03	5.6E-06	3.7E-04	0.0E+00	1.0E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-90	1.5E+01	2.5E-02	1.6E+00	0.0E+00	4.7E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nb-94	4.5E-09	7.6E-12	5.0E-10	0.0E+00	1.4E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99	2.9E-03	4.9E-06	3.2E-04	0.0E+00	9.2E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-129	4.7E-06	7.9E-09	5.2E-07	0.0E+00	1.5E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cs-137	1.5E+01	2.5E-02	1.6E+00	0.0E+00	4.6E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-152	1.0E-03	1.7E-06	1.1E-04	0.0E+00	3.3E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-154	1.9E-01	3.2E-04	2.1E-02	0.0E+00	6.0E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pb-210	3.8E-11	6.4E-14	4.2E-12	0.0E+00	1.2E-11	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-226	5.4E-09	9.0E-12	5.9E-10	0.0E+00	1.7E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-228	8.1E-13	1.4E-15	9.0E-14	0.0E+00	2.6E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ac-227	1.4E-09	2.3E-12	1.5E-10	0.0E+00	4.4E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-228	2.5E-04	4.2E-07	2.8E-05	0.0E+00	7.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-229	1.2E-11	1.9E-14	1.3E-12	0.0E+00	3.7E-12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-230	2.0E-08	3.4E-11	2.2E-09	0.0E+00	6.4E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-232	3.8E-14	6.4E-17	4.2E-15	0.0E+00	1.2E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pa-231	3.7E-09	6.2E-12	4.1E-10	0.0E+00	1.2E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-232	5.1E-07	8.5E-10	5.6E-08	0.0E+00	1.6E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-233	7.2E-10	1.2E-12	8.0E-11	0.0E+00	2.3E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-234	5.1E-05	8.6E-08	5.7E-06	0.0E+00	1.6E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-235	3.3E-07	5.6E-10	3.7E-08	0.0E+00	1.1E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-236	8.3E-07	1.4E-09	9.2E-08	0.0E+00	2.6E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-238	1.7E-08	2.9E-11	1.9E-09	0.0E+00	5.5E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Np-237	5.0E-06	8.4E-09	5.5E-07	0.0E+00	1.6E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-238	6.1E-02	1.0E-04	6.7E-03	0.0E+00	1.9E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-239	1.0E-03	1.7E-06	1.1E-04	0.0E+00	3.2E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-240	7.8E-04	1.3E-06	8.6E-05	0.0E+00	2.5E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-241	8.8E-02	1.5E-04	9.8E-03	0.0E+00	2.8E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-242	1.6E-06	2.7E-09	1.8E-07	0.0E+00	5.1E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-244	2.4E-14	4.1E-17	2.7E-15	0.0E+00	7.8E-15	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-241	4.3E-03	7.3E-06	4.8E-04	0.0E+00	1.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-243	4.1E-05	6.9E-08	4.5E-06	0.0E+00	1.3E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-243	1.3E-06	2.2E-09	1.4E-07	0.0E+00	4.1E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-244	7.9E-05	1.3E-07	8.8E-06	0.0E+00	2.5E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-245	7.2E-09	1.2E-11	7.9E-10	0.0E+00	2.3E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-246	5.7E-10	9.6E-13	6.3E-11	0.0E+00	1.8E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-247	7.4E-16	1.2E-18	8.1E-17	0.0E+00	2.3E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-248	8.9E-16	1.5E-18	9.9E-17	0.0E+00	2.8E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table F-32. Best-estimate activities associated with hot cell waste disposals sent to RWMC from 1983 through 1993. (These inventories are included in the INTEC-MOD-3R waste stream).

Nuclide	1984 (Ci)	1985 (Ci)	1986 (Ci)	1987 (Ci)	1988 (Ci)	1989 (Ci)	1990 (Ci)	1991 (Ci)	1992 (Ci)	1993 (Ci)
H-3	2.40E-03	2.95E-03	4.85E-02	2.04E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Be-10	3.2E-11	3.9E-11	6.5E-10	2.7E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
C-14	1.4E-09	1.7E-09	2.7E-08	1.1E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cl-36	0.0E+00									
Co-60	1.1E-03	1.3E-03	2.1E-02	8.9E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-59	2.8E-06	3.5E-06	5.7E-05	2.4E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-63	1.9E-04	2.3E-04	3.9E-03	1.6E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-90	8.6E-01	1.1E+00	1.7E+01	7.3E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nb-94	2.6E-10	3.2E-10	5.3E-09	2.2E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99	1.7E-04	2.1E-04	3.4E-03	1.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-129	2.7E-07	3.3E-07	5.5E-06	2.3E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cs-137	8.4E-01	1.0E+00	1.7E+01	7.2E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-152	6.0E-05	7.4E-05	1.2E-03	5.1E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-154	1.1E-02	1.3E-02	2.2E-01	9.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pb-210	2.2E-12	2.7E-12	4.4E-11	1.9E-11	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-226	3.1E-10	3.8E-10	6.3E-09	2.6E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-228	4.7E-14	5.8E-14	9.5E-13	4.0E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ac-227	8.1E-11	9.9E-11	1.6E-09	6.8E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-228	1.4E-05	1.8E-05	2.9E-04	1.2E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-229	6.7E-13	8.2E-13	1.3E-11	5.7E-12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-230	1.2E-09	1.4E-09	2.3E-08	9.9E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-232	2.2E-15	2.7E-15	4.4E-14	1.9E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pa-231	2.1E-10	2.6E-10	4.3E-09	1.8E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-232	2.9E-08	3.6E-08	5.9E-07	2.5E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-233	4.2E-11	5.1E-11	8.4E-10	3.5E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-234	3.0E-06	3.6E-06	6.0E-05	2.5E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-235	1.9E-08	2.4E-08	3.9E-07	1.6E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-236	4.8E-08	5.9E-08	9.7E-07	4.1E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-238	1.0E-09	1.2E-09	2.0E-08	8.5E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Np-237	2.9E-07	3.6E-07	5.8E-06	2.5E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-238	3.5E-03	4.3E-03	7.1E-02	3.0E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-239	5.8E-05	7.1E-05	1.2E-03	4.9E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-240	4.5E-05	5.5E-05	9.1E-04	3.8E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-241	5.1E-03	6.3E-03	1.0E-01	4.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-242	9.3E-08	1.1E-07	1.9E-06	7.9E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-244	1.4E-15	1.7E-15	2.9E-14	1.2E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-241	2.5E-04	3.1E-04	5.0E-03	2.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-243	2.4E-06	2.9E-06	4.8E-05	2.0E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-243	7.5E-08	9.2E-08	1.5E-06	6.3E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-244	4.6E-06	5.6E-06	9.3E-05	3.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-245	4.2E-10	5.1E-10	8.4E-09	3.5E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-246	3.3E-11	4.1E-11	6.7E-10	2.8E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-247	4.3E-17	5.2E-17	8.6E-16	3.6E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-248	5.2E-17	6.4E-17	1.0E-15	4.4E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table F-33. Upper-bound activities associated with hot cell waste disposals sent to RWMC from 1983 through 1993. (These inventories are included in the INTEC-MOD-3R waste stream).

Nuclide	1984 (Ci)	1985 (Ci)	1986 (Ci)	1987 (Ci)	1988 (Ci)	1989 (Ci)	1990 (Ci)	1991 (Ci)	1992 (Ci)	1993 (Ci)
H-3	2.40E-03	2.95E-03	4.85E-02	2.04E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Be-10	3.2E-11	3.9E-11	6.5E-10	2.7E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
C-14	1.4E-09	1.7E-09	2.7E-08	1.1E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cl-36	0.0E+00									
Co-60	1.1E-03	1.3E-03	2.1E-02	8.9E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-59	2.8E-06	3.5E-06	5.7E-05	2.4E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-63	1.9E-04	2.3E-04	3.9E-03	1.6E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-90	8.6E-01	1.1E+00	1.7E+01	7.3E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nb-94	2.6E-10	3.2E-10	5.3E-09	2.2E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99	1.7E-04	2.1E-04	3.4E-03	1.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-129	2.7E-07	3.3E-07	5.5E-06	2.3E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cs-137	8.4E-01	1.0E+00	1.7E+01	7.2E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-152	6.0E-05	7.4E-05	1.2E-03	5.1E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-154	1.1E-02	1.3E-02	2.2E-01	9.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pb-210	2.2E-12	2.7E-12	4.4E-11	1.9E-11	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-226	3.1E-10	3.8E-10	6.3E-09	2.6E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-228	4.7E-14	5.8E-14	9.5E-13	4.0E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ac-227	8.1E-11	9.9E-11	1.6E-09	6.8E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-228	1.4E-05	1.8E-05	2.9E-04	1.2E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-229	6.7E-13	8.2E-13	1.3E-11	5.7E-12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-230	1.2E-09	1.4E-09	2.3E-08	9.9E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-232	2.2E-15	2.7E-15	4.4E-14	1.9E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pa-231	2.1E-10	2.6E-10	4.3E-09	1.8E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-232	2.9E-08	3.6E-08	5.9E-07	2.5E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-233	4.2E-11	5.1E-11	8.4E-10	3.5E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-234	3.0E-06	3.6E-06	6.0E-05	2.5E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-235	1.9E-08	2.4E-08	3.9E-07	1.6E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-236	4.8E-08	5.9E-08	9.7E-07	4.1E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-238	1.0E-09	1.2E-09	2.0E-08	8.5E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Np-237	2.9E-07	3.6E-07	5.8E-06	2.5E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-238	3.5E-03	4.3E-03	7.1E-02	3.0E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-239	5.8E-05	7.1E-05	1.2E-03	4.9E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-240	4.5E-05	5.5E-05	9.1E-04	3.8E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-241	5.1E-03	6.3E-03	1.0E-01	4.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-242	9.3E-08	1.1E-07	1.9E-06	7.9E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-244	1.4E-15	1.7E-15	2.9E-14	1.2E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-241	2.5E-04	3.1E-04	5.0E-03	2.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-243	2.4E-06	2.9E-06	4.8E-05	2.0E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-243	7.5E-08	9.2E-08	1.5E-06	6.3E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-244	4.6E-06	5.6E-06	9.3E-05	3.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-245	4.2E-10	5.1E-10	8.4E-09	3.5E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-246	3.3E-11	4.1E-11	6.7E-10	2.8E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-247	4.3E-17	5.2E-17	8.6E-16	3.6E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-248	5.2E-17	6.4E-17	1.0E-15	4.4E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table F-34. Lower-bound activities associated with hot cell waste disposals sent to RWMC from 1983 through 1993. (These inventories are included in the INTEC-MOD-3R waste stream).

Nuclide	1984 (Ci)	1985 (Ci)	1986 (Ci)	1987 (Ci)	1988 (Ci)	1989 (Ci)	1990 (Ci)	1991 (Ci)	1992 (Ci)	1993 (Ci)
H-3	2.40E-03	2.95E-03	4.85E-02	2.04E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Be-10	3.2E-11	3.9E-11	6.5E-10	2.7E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
C-14	1.4E-09	1.7E-09	2.7E-08	1.1E-08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cl-36	0.0E+00									
Co-60	1.1E-03	1.3E-03	2.1E-02	8.9E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-59	2.8E-06	3.5E-06	5.7E-05	2.4E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ni-63	1.9E-04	2.3E-04	3.9E-03	1.6E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-90	8.6E-01	1.1E+00	1.7E+01	7.3E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Nb-94	2.6E-10	3.2E-10	5.3E-09	2.2E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99	1.7E-04	2.1E-04	3.4E-03	1.4E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-129	2.7E-07	3.3E-07	5.5E-06	2.3E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cs-137	8.4E-01	1.0E+00	1.7E+01	7.2E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-152	6.0E-05	7.4E-05	1.2E-03	5.1E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Eu-154	1.1E-02	1.3E-02	2.2E-01	9.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pb-210	2.2E-12	2.7E-12	4.4E-11	1.9E-11	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-226	3.1E-10	3.8E-10	6.3E-09	2.6E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ra-228	4.7E-14	5.8E-14	9.5E-13	4.0E-13	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ac-227	8.1E-11	9.9E-11	1.6E-09	6.8E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-228	1.4E-05	1.8E-05	2.9E-04	1.2E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-229	6.7E-13	8.2E-13	1.3E-11	5.7E-12	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-230	1.2E-09	1.4E-09	2.3E-08	9.9E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Th-232	2.2E-15	2.7E-15	4.4E-14	1.9E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pa-231	2.1E-10	2.6E-10	4.3E-09	1.8E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-232	2.9E-08	3.6E-08	5.9E-07	2.5E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-233	4.2E-11	5.1E-11	8.4E-10	3.5E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-234	3.0E-06	3.6E-06	6.0E-05	2.5E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-235	1.9E-08	2.4E-08	3.9E-07	1.6E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-236	4.8E-08	5.9E-08	9.7E-07	4.1E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
U-238	1.0E-09	1.2E-09	2.0E-08	8.5E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Np-237	2.9E-07	3.6E-07	5.8E-06	2.5E-06	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-238	3.5E-03	4.3E-03	7.1E-02	3.0E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-239	5.8E-05	7.1E-05	1.2E-03	4.9E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-240	4.5E-05	5.5E-05	9.1E-04	3.8E-04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-241	5.1E-03	6.3E-03	1.0E-01	4.3E-02	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-242	9.3E-08	1.1E-07	1.9E-06	7.9E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Pu-244	1.4E-15	1.7E-15	2.9E-14	1.2E-14	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-241	2.5E-04	3.1E-04	5.0E-03	2.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Am-243	2.4E-06	2.9E-06	4.8E-05	2.0E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-243	7.5E-08	9.2E-08	1.5E-06	6.3E-07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-244	4.6E-06	5.6E-06	9.3E-05	3.9E-05	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-245	4.2E-10	5.1E-10	8.4E-09	3.5E-09	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-246	3.3E-11	4.1E-11	6.7E-10	2.8E-10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-247	4.3E-17	5.2E-17	8.6E-16	3.6E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cm-248	5.2E-17	6.4E-17	1.0E-15	4.4E-16	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00